NOVEMBER, 1949
69th Year

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING • WARM AIR HEATING • SHEET METAL CONTRACTING

RESEARCH RESIDENCE NO. 3

Here is the newest research residence at the University of Illinois. Heating low cost houses is to be studied in this project.

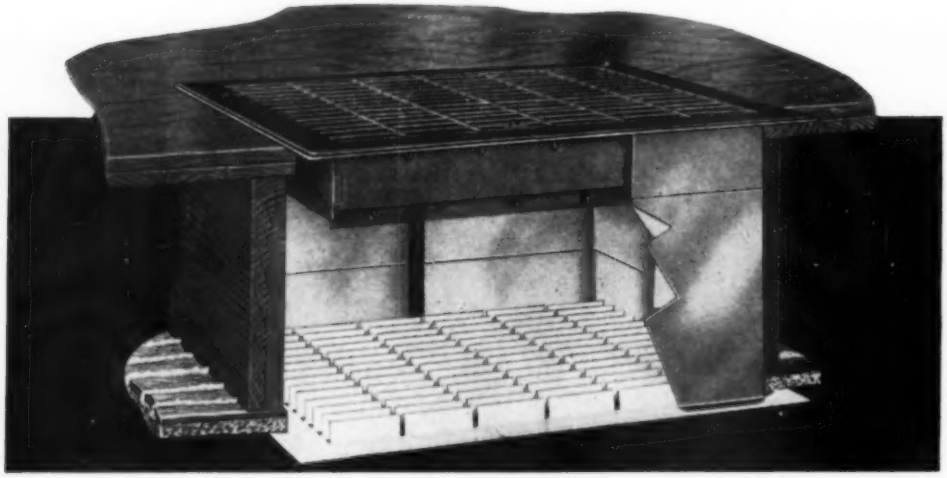
- An Illinois contractor uses radio announcements and newspaper advertising to keep his sales volume at a steady peak. Page 64.
- Pension plans are a subject of national interest at this time. The article on Page 69 tells how to figure social security benefits.
- Actual operation of an electronic control system is described in Edwin F. Snyder's article in this issue. Page 75.
- E. E. Herbacek discusses the correct design of exhaust systems for welding operations on Page 94.

Air Control's

adjustable

CEILING VENTILATORS

are your best buy

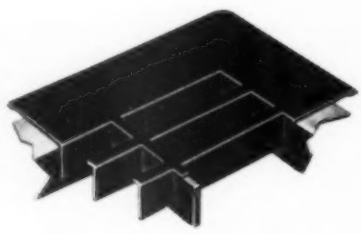


because – they are built with the famous Air Control UNIT-GRID construction. UNIT-GRID construction gives a stronger better looking face. UNIT-GRID construction gives you full depth grids, seamless corners and a flat walking surface. UNIT-GRID Registers are the only registers using the Dial operated valve, the operator that rolls the valve open.

Air Control Adjustable Ceiling Ventilators provide air circulation to those upper rooms where heating is from a pipeless furnace, stove, space heater, etc.

because – Air Control's Adjustable Ceiling Ventilators are easy to install in either old or new construction. Made in three parts — black Floor Register, white Face and adjustable telescoping metal box. Packed in individual cartons. Made in sizes 8 x 10, 9 x 12, 10 x 12 and 12 x 14.

Air Control's Adjustable Ceiling Ventilators are the answer to many of your heat circulating problems — start using them today.



Section shows deep frets locked with heavy cross frets providing strength plus greater free area.

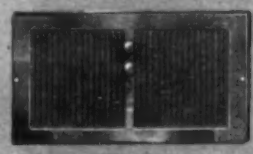
Write Today for your copy of Catalog 48 showing the complete Air Control line of Registers, Grilles, etc.

AIR CONTROL PRODUCTS, Inc.

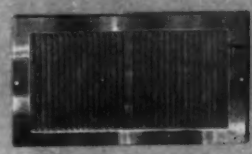
COOPERSVILLE MICHIGAN

"THE AIR CONTROL LINE IS THE COMPLETE LINE."

AIR CONDITIONING REGISTERS

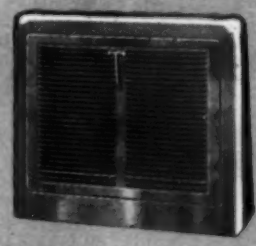


NO. 10 PUSH BUTTON REGISTER DUAL CONTROL



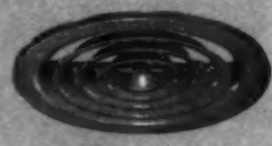
NO. 110 REGISTER, SINGLE DAMPER

NO. 210 REGISTER, SINGLE DAMPER

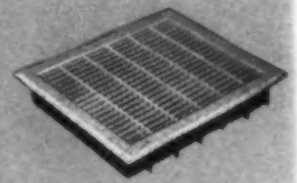


NO. 30 BASEBOARD GRAVITY REGISTER

NO. 80 SIDEWALL GRAVITY REGISTER



CEILING DIFFUSERS



NO. 40 FLOOR REGISTER RIGID-LOCK CONSTRUCTION

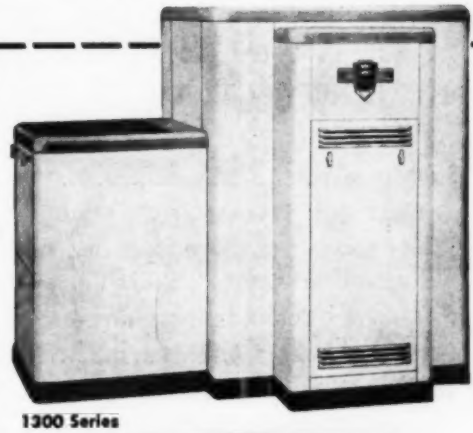
Waterbury

WILSON & CO. INC.

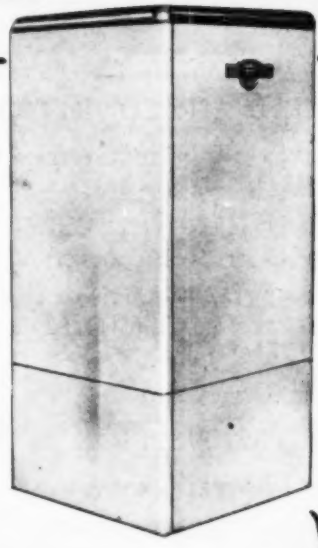
The combination that means the LAST WORD in Conditioned Air.

In maintaining its high position among modern winter air conditioning units for the home, Waterbury relies upon Wilson *Hair* Filters (Honeycomb Type) for dependable air cleaning service—for *more cleaned air per filter*—for *cleaning* without *clogging*.

6300 Series



1300 Series



Hi-Boy

The famous Edgeseal, the original *Hair* Filter with the patented "self-sealing" edge.

The Honeycomb, the dressed-up type *Hair* Filter.

Save DELAY...Save DOUBT...Save DOLLARS!

Send for FREE samples with details and prices.

Wilson *Hair* Filters are another quality product of Wilson & Co., Inc.—(World famous for outstanding quality in Meats, Sports Equipment, Pharmaceuticals, Hair Products, etc.)

WILSON & CO., INC. (Air Filter Division) 4100 S. Ashland Ave., Chicago 9, Ill.

WILSON'S **HAIR** FILTER

AMERICAN ARTISAN

RESIDENTIAL
AIR CONDITIONING
WARM AIR HEATING
SHEET METAL CONTRACTING

Merged with American Artisan are "Warm Air Heating" and "Furnaces and Sheet Metals"

Member—Audit Bureau of Circulations
Member—Associated Business Papers

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Founded 1880

NOVEMBER, 1949

Volume 118, No. 11

Preferred by all SYNCROMATIC

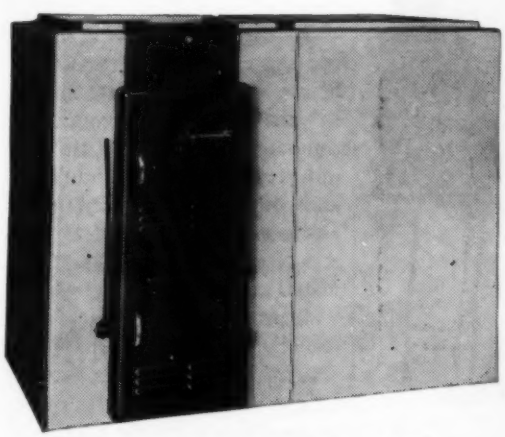
that's what DEALERS say of these *Modern* WARM-AIR FURNACES *for*

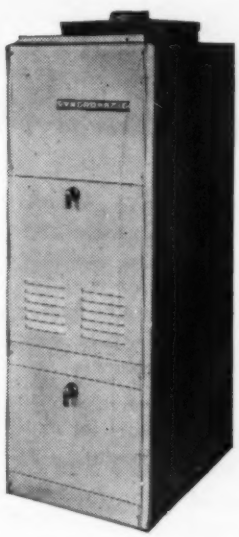
COAL · GAS · OIL · *Modern Design*

COUNTER-FLOW HEATING MAKE SYNCROMATIC A FAVORITE

CFB COAL FIRED UNIT

Only Syncromatic has this design . . . the result of intelligent and logical application of the "COUNTER-FLOW" principle and a completely and unparalleled Front construction . . . GROUND FIT DOORS COMBINED WITH VENTILATED STEEL CABINET SHIELD. The only coal unit made that can be converted to high efficiency oil firing.





Syncromatic COUNTER FLOW

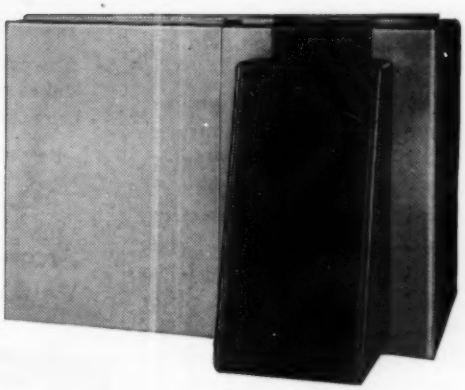
COUNTER FLOW PRINCIPLE MEANS PERFECTION IN HEATING EFFICIENCY

GFB GAS FIRED UNIT

A complete range from 75,000 to 240,000 BTU. All heat exchangers built of heavy 10 gauge corrosion resisting steel. "COUNTER-FLOW" principle as used in all Syncromatic Furnace Units.

OFB OIL FIRED UNIT

The Syncromatic Oil Fired Unit employs the "COUNTER-FLOW" principle in warm air heating . . . one of the most efficient methods of heat transfer known. Compact and completely welded heavy gauge heat exchanger . . . your best insurance for safety and long life. Just compare the gauge and construction of Syncromatic with any other oil-fired unit.



Syncromatic Corporation

WATERTOWN, WISCONSIN

the editor's notebook

NWAH&ACA Convention

One of the many highlights of the National Warm Air Heating and Air Conditioning Association's annual convention in Cleveland, December 14-15, will be *House Beautiful's* Climate Control Project. Miss Elizabeth Gordon, editor of *House Beautiful*, will describe this research project which is based on the fact that there are not just two or three climate zones in this country but literally dozens. It is not temperature alone that makes different climates, but humidity, rainfall, winds, the number and severity of storms, amount and duration of snowfalls, fog, and smoke. All of these factors vary in amounts and combination and make up the broad term "climate" which in turn affects living conditions. The purpose of Miss Gordon's program is to furnish data that permit these elements to be manipulated to take a large part of the environmental load off a house and its occupants. Through the findings it is hoped that houses can be designed in such a manner that they fit the local climate and reduce the stresses and strains it puts on man and materials.

To help Miss Gordon present the story of this project will be Dr. L. P. Herrington, director of research, John B. Pierce Laboratory of Hygiene, associate professor in Public Health, Yale University; James M. Fitch, architectural editor of *House Beautiful*, and Henry N. Wright, architect and consultant. The title of Dr. Herrington's talk will be Human Comfort and Air Temperature, Humidity,

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ATTENTION

Sheet Metal Men

There is a steady demand for VITROLINER CHIMNEY LINERS in every city of the U. S. and Canada. Every home is a prospect, especially where oil or gas is used in the heating plant. If your organization is aggressive and reliable, you can establish a profitable year 'round business in your community.

Our Distributors can supply VITROLINER in quantity quickly and efficiently. We show you how to build a money making business—how to cash in on the tremendous demand for quality VITROLINER CHIMNEY LINERS.

- ELIMINATES FIRE HAZARDS
- CREATES BETTER DRAFT
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- PREVENTS CONDENSATION DAMAGE
- ASSURES LONGER LIFE

VITROLINER, a pioneer product, protects and preserves the chimney from the harmful and destructive properties of combustion. Manufactured from heavy-gauge iron, coated with acid-resisting vitreous enamel.

The actual installation is easy and takes only a few hours for experienced sheet metal men.

Recommended by many leading gas companies, coal and oil burning equipment manufacturers.

- ECONOMICAL
- DURABLE AND PRACTICAL

FOR FURTHER INFORMATION WRITE TO

CONDENSATION ENGINEERING CORPORATION

122 SO. MICHIGAN AVE. CHICAGO 3, ILL.

the editor's notebook

Movement. Mr. Fitch will present Why Many American Climates Offer New Potentials to the Warm Air Heating Industry. Mr. Wright's speech is entitled New Systems and Applications for Year 'Round Use of Forced Warm Air Systems.

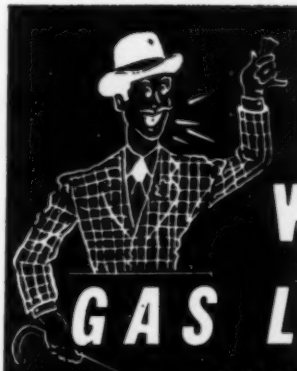
Information from this project should prove of vast interest to the heating industry for it will be helpful in warm air heating development work and also presenting new ideas in sales management and new markets.

OHI Promotes

To meet the growing need for aggressive local promotion of the story of oil heat similar to the overall promotional campaigns pursued by the oil industry, the baking industry, and others, the Distribution Division of the Oil-Heat Institute of America has just released a complete advertising and promotion campaign for use by local OHI chapters, dealers and individuals.

The campaign, first of a series planned by the OHI for merchandising the advantages of oil heating directly to the American public, consists of advertisements, promotional literature, window displays, truck signs, and outdoor advertising board designs.

Theme of the campaign is based on the line "Oil is the Modern Fuel—in the skyways, on the highways, over the rails and to heat your home" and points up oil heat as carefree, clean, and economical. The materials are signed with the line "Oil Heat . . . Proved and Approved by Millions!"



Bid for Business WITH 3 NEW MEYER GAS LINES...

AGA APPROVED

Q Series Gas-fired Gravity Furnace

G Series Gas-fired Air Conditioner

M Series Gas-fired Hi-Boy Air Conditioner

Easy TO SELL... and Keep SOLD

- Easy to install, — and easy to service
- Engineered for gas — with maximum efficiency
- Exclusive Meyer heat interchanger means fast, low-cost heating
- Heavy steel frame and casing, easily leveled
- Exclusive, new ribbon or fountain burner
- Complete line—75,000 Btu/hr. to 500,000 Btu/hr. input
- Clean, compact and attractively designed

COMPLIES WITH NATIONAL SAFETY REQUIREMENTS · AMERICAN GAS ASSOCIATION · APPROVED ·

AGA approved for all gases, for both low and high altitude operation.

• Meyer engineered these units for today's market! Make your bid for business with this latest line of Meyer Gas Furnaces and Winter Air Conditioners. They are completely new in design — built to burn gas with the greatest efficiency of any gas burning furnace! And Meyer is easy to install, with no profit-eating return service calls.

Check on Meyer advantages. Here's a complete line from one reliable manufacturer, with undivided responsibility. Write for complete information.

WEIR-MEYER MEANS *Modern* HEAT

THE MEYER FURNACE COMPANY - GENERAL OFFICES. INDOOR COMFORT PEORIA 2, ILLINOIS

Gas-fired Hi-boy | Gas-fired Air Conditioner | Gas-fired Gravity | Oil-fired Hi-boy | Oil-fired Air Conditioner | Weir Steel Furnace | Coal-fired Air Conditioner | Industrial & Commercial Heating Equipment

MANUFACTURERS OF WEIR & MEYER FURNACES - AIR CONDITIONERS FOR GAS - OIL - COAL - FACTORIES: PEORIA AND PERU, ILLINOIS

the editor's notebook

Anthracite Instructs

School days are here—for everyone connected with the anthracite industry, from coal yard owners right up to multi-million-ton producers. Following the popular trend in the heating industry of educating dealers to re-educate the public, the anthracite industry is attempting to regain lost ground in sales by proving that, with stoker equipment, anthracite is a completely automatic fuel, cheaper and more efficient than its rivals.

Since classes started on July 26, in the factory of Electric-Furnace Man, Inc., stoker manufacturers of Emmaus, Pa., scores of dealers and coal company personnel have attended the one-day course, held twice weekly. By citing case histories and pointing out advantages of stoker equipment, the instructor explains to dealers how to make the public conscious of the desirability of automatic anthracite heat. He stresses the fact that the public wants automatic heat. If they seem to prefer fuels other than anthracite it is only because they have not been taught that anthracite can offer a completely automatic heat. Other points brought out are the long life of stoker equipment, and the fact that original cost is quickly liquidated by the great savings realized on fuel.

Following this consumer sales story, the coal dealer is told of the specific advantages to himself which are to be found in entering the equipment business. A dealer's customer list is a made-to-order source of equipment prospects. Each prospect that becomes a stoker equipment customer assures the dealer of steady, year after year business in anthracite—a business that cannot be taken away by salesmen of competitive fuels.

Proof of the effectiveness of this education-promotion plan lies in the comments of coal company officials who have reported a general increase of interest in automatic equipment among dealers who have attended the sessions.

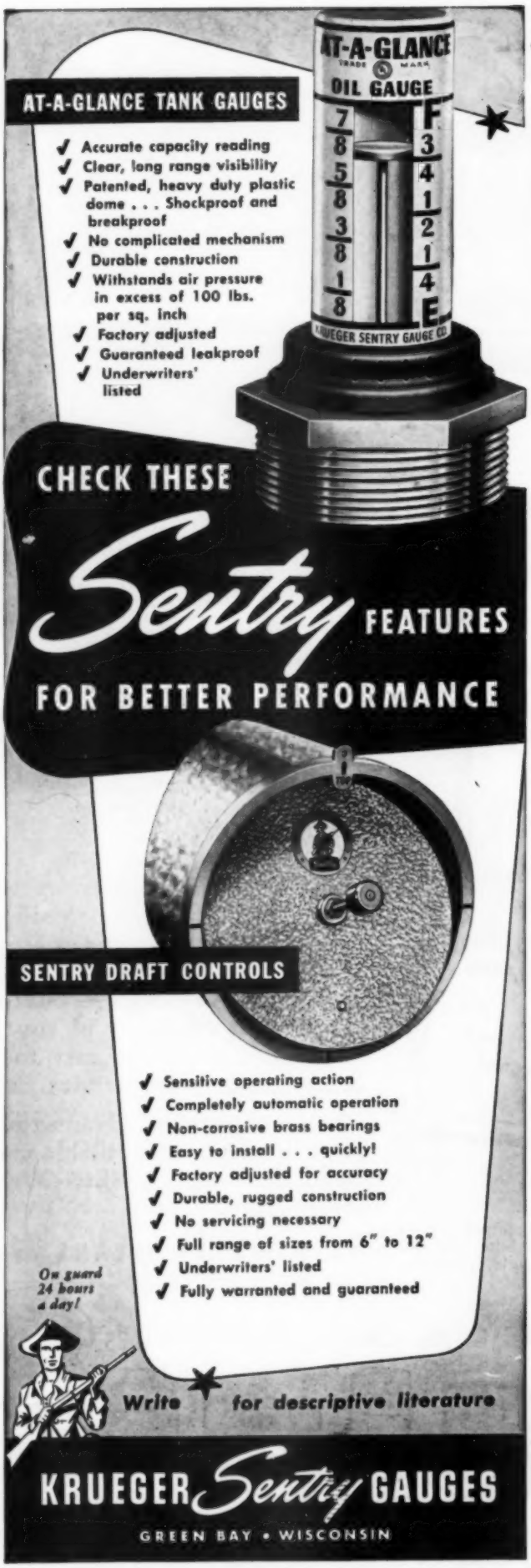
It is not surprising, therefore, that coal companies are enthusiastically recommending the school to all anthracite distributors, dealers, and salesmen.

Frank W. Earnest, Jr., president of the Anthracite Institute, has called the stoker equipment school an "outstanding contribution to the industry," and has expressed the opinion that every coal dealer and every wholesale representative in the country should attend the one-day course.

Perimeter Heating Forms

The publication of a design procedure for perimeter warm air heating has been announced by the National Warm Air Heating and Air Conditioning Association. The procedure, entitled Warm Air Perimeter Systems (Form 5), provides all the data required to design a perimeter system for slab floor houses of not over 60,000 Btuh heat loss.

With this type of system, owners of low cost, slab floor houses can have all the advantages of forced warm air heating with filtered, humidified, and circulated air and warm


AT-A-GLANCE TANK GAUGES
✓ Accurate capacity reading
✓ Clear, long range visibility
✓ Patented, heavy duty plastic dome . . . Shockproof and breakproof
✓ No complicated mechanism
✓ Durable construction
✓ Withstands air pressure in excess of 100 lbs. per sq. inch
✓ Factory adjusted
✓ Guaranteed leakproof
✓ Underwriters' listed
AT-A-GLANCE
OIL GAUGE
KRUEGER SENTRY GAUGE CO
CHECK THESE
Sentry FEATURES
FOR BETTER PERFORMANCE
SENTRY DRAFT CONTROLS
✓ Sensitive operating action
✓ Completely automatic operation
✓ Non-corrosive brass bearings
✓ Easy to install . . . quickly!
✓ Factory adjusted for accuracy
✓ Durable, rugged construction
✓ No servicing necessary
✓ Full range of sizes from 6" to 12"
✓ Underwriters' listed
✓ Fully warranted and guaranteed
On guard 24 hours a day!
Write for descriptive literature
KRUEGER Sentry GAUGES
GREEN BAY • WISCONSIN

the editor's notebook

THIS MONTH'S MERCHANDISING IDEA

Prospect pushes a button and this new electric display shows how a Field Fuel Saving System would work on his furnace.

TO SELL...DEMONSTRATE

Audience Participation

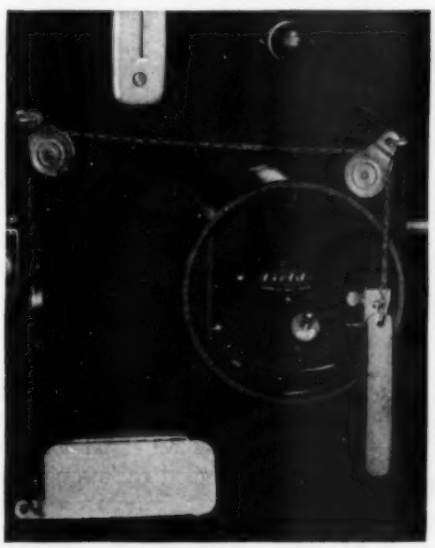
Motion displays are eye-catchers. They're *sales makers!* And these motion displays are at their best when the *prospect* can start, stop, and control the motion. Such a display has been developed for the Field Fuel Saving System and is now available to jobbers and dealers.

Customers Sell Themselves

The new display is designed to show the prospect just how the Field Fuel Saving System would operate on his own hand-fired furnace. He changes the thermostat setting and *presto* . . . the motor hums into action, dampers open and close, lights flash. The synchronized action of the thermostat, check damper and ash pit door damper show just what happens when the thermostat calls for more heat, he sees what happens when the heat has reached the thermostat setting. He pushes the Stoke-Switch button, and sees how the furnace is immediately prepared for firing — with check damper automatically closing and the ash pit door damper opening. The controls are held in that position for several minutes, then automatically return to thermostat control.

A Compact Display

The new plug-in, electric display is counter size — 20" x 20", made of 16 gauge steel, maroon finished, and weighs only 25 pounds complete with controls. Rubber feet hold it from slipping, protect the surface on which it is placed. The display provides the perfect background for a sales story — the prospect seeing what happens, the dealer pointing out how and why. Such modern merchandising aids should be used by every dealer to assure profitable sales volume.



Both check damper and ash pit door damper are shown in synchronized action by new electric Field display.

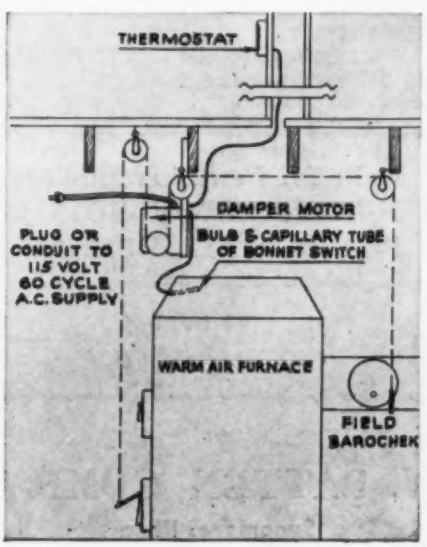

THERMOSTAT
DAMPER MOTOR
BULB & CAPILLARY TUBE OF BONNET SWITCH
PLUG OR CONDUIT TO 115 VOLT 60 CYCLE A.C. SUPPLY
WARM AIR FURNACE
FIELD BAROCHEK

Diagram showing installation of Fuel Saving System. Display simulates actual, installed operation.

field

LEADS THE FIELD WITH A DRAFT CONTROL FOR EVERY PURPOSE

FOR WATER HEATERS

FIELD RNA-W, pre-set, precision-made, the finishing touch to a fine water heater.

FOR STOVES

FIELD R series, the exclusive, patented Field design brings new economies, finer performance to stoves and ranges.

FOR HAND-FIRED FURNACES

FIELD BAROCHEK, combination check damper and barometric draft control, for the hand-fired market.

FOR AUTOMATIC HEATING PLANTS

FIELD TYPE M, the original Field control, first choice for the finest automatic heating equipment.

SAFETY CONTROL

For hand-fired furnaces, automatically drops draft damper when bonnet temperature approaches a dangerous limit. Remembers when home-maker forgets.

FIELD FUEL SAVING SYSTEM

FIELD damper-motor set, new, with many exclusive, patented features. Simpler, more compact, easier to install.

WRITE for full information on the Field Draft Control line.

field CONTROL DIVISION

H. D. CONKEY & CO., MENDOTA, ILL.

AFFILIATES:

Conco Building Products, Inc.
Brick - Tile - Stone

Conco Materials Handling Division
Cranes - Hoists

floors. It is actually a combination convection-panel system.

The convection effect is produced by discharging air from the ducts in the floor into the rooms, through floor or baseboard registers. The panel effect is produced by 8 in. round ducts embedded in the concrete slab, along the outer edges.

Complete details about the design and installation of perimeter systems are being published in current issues of AMERICAN ARTISAN: Heating Basementless Houses With Warm Air, by S. Konzo, W. R. Hedrick, and J. M. David.

Form 5 is a four page work sheet which may be ordered direct from the association's offices, 145 Public Square, Cleveland 14, Ohio, at $6 per 100.

Think U. S. Favors Farmers

A recent survey shows that approximately four out of 10 American voters believe the government in Washington has treated farmers better than either labor or business.

Of those questioned, 41 per cent thought farmers had been treated best, 25 per cent said labor, and 13 per cent that business had been favored.

Industry's Failure

Today's labor problems are the result largely of industry's failure to dignify labor, De Forest Pratt, director of training for Cincinnati Milling and Grinding Machines, Inc., recently declared at the fall meeting of the American Society of Mechanical engineers. This failure is responsible for

TAILOR-MADE QUALITY
for the
MASS-HOUSING MARKET

NEW UNITS — NEW DESIGNS
BETTER THAN EVER!

6 SIZES COUNTER-FLO BASEMENT TYPE
65,000 - 85,000 - 100,000 - 135,000 - 165,000
200,000 B.t.u.
3 SIZES UTILITY TYPE HI-BOYS
65,000 - 85,000 - 100,000 B.t.u.
2 SIZES GRAVITY FURNACES
60,000 - 80,000 B.t.u.

Write for New Literature on
COUNTER-FLOW HI-BOYS *for*
FLOOR PANEL HEATING

Built and Priced for
YOUR PROFIT

Write

J. V. PATTEN COMPANY

Sycamore, Illinois
Originally Established in 1898
Incorporated in 1928

the editor's notebook

the difficulty experienced by industry in attracting the finest young men to shop and factory.

"As many of you know from personal experience," said Mr. Pratt, "most mothers (and dads too) are ambitious that their boy should graduate from college so that he may become a doctor, lawyer, judge, statesman, or other similar public figure. The thought of having him enter a shop has not been too well received. It is believed that one of the reasons for this is that we of industry have failed to dignify labor—to dignify apprenticeship so that the finest young men may be attracted to it. Perhaps if we had done so down through the years some of us would not now be suffering so acutely from labor complications.

"From the beginning of man," he said, "apprenticeship has been the principle means by which he has perpetuated all of his skills and knowledge. From early apprenticeship practices has come much of our formal educational systems. It has been the principal source of the basic philosophies and almost indispensible skills and traditions that have made possible the arts and crafts leading to our present standards of living."

How Businesses Start

I am a journeyman sheet metal worker interested in entering the sheet metal business. I have a good background for managing a business of this type. Would it be possible to obtain assistance from a furnace manufacturer to help me get started? If this is possible

THERE'S A LOCKFORMER THAT'S . . .

THE RIGHT SIZE FOR YOUR SHOP . . .

THE RIGHT CAPACITY FOR YOUR SHOP . . .

THE RIGHT PRICE FOR YOUR SHOP . . .

IN LOCKFORMER'S COMPLETE LINE OF SHEET METAL ROLLING EQUIPMENT!

Lockformers make Pittsburgh Locks 15 times faster than hand-brake methods—make other seams with similar speed and drastically reduced costs! Naturally, the tougher the competition, the more you *need* a Lockformer—and the more you *use* your Lockformer, the more those "extra" Lockformer profits pile up. Whether it's a Buyer's Market or a Seller's Market, your Lockformer is both a business-getter *and* a money-maker.

Lockformer models 24, 22, 20, 18 and 16—Power Flanger models 18, 16 and 14—The Cleatformer—the Easy Edger—Standard Auxiliary Rolls—Power Flanger Attachments—and a wide assortment of Special Machinery permit you to choose the "right" equipment for *your* shop, *your* volume, *your* budget! Write for our Catalog.

ONE MAN WITH A LOCKFORMER MAKES MORE PITTSBURGH LOCKS THAN SIXTEEN MEN WITH EIGHT BRAKES

THE LOCKFORMER CO.

4615 W. ROOSEVELT ROAD • CHICAGO 50, ILLINOIS

would you please send me the names of some firms and also the names of individuals in these firms that I can contact?

My shop would be located in a city of 2,000 population in central (state).

K. E. Y.

Approved Gas-Coal Furnaces?

Will you please send us a list of manufacturers who make either cast iron or steel, coal fired furnaces, approved for gas?

The problem I am confronted with is: Can a manufacturer who is making a coal fired furnace which has not been approved by A.G.A. install in this unit an approved conversion gas burner and offer the complete assembly for sale as an approved unit?

Any information you furnish will be greatly appreciated.

A. T. Dingeldein
A. T. Dingeldein Co.
Springfield, Ohio.

Fuel Charts

In the September 1948 issue you had a page with a table and chart for estimating annual fuel costs which has been of immeasurable value to us in selling oil burning equipment.

Would it be possible for me to get a dozen copies of this page so we may give them to dealers? If not, may we have three or four, or even one? We would appreciate this help and I believe the table and chart would be advertisement for your splendid magazine in Georgia and Alabama as I have already worn out the page which I cut from the issue.

H. P. Fields, our representative in Atlanta, Georgia, has been a subscriber for years and he brought this to my attention.

A. Perry Gordon
Columbus, Ga.

We have received numerous inquiries for these charts which may be reproduced locally if desired. Permission will be granted upon request. —ED.

Basementless Houses

We would appreciate receiving a reprint of the article published in the August issue entitled Heating Basementless Houses With Warm Air, Part I, and also succeeding parts.

If there is a charge involved, please advise and we will forward our check.

Leo Friedberg
House Utilities Co.
Elizabeth, N. J.

We would like to obtain 12 reprints of the articles on heating basementless houses. Also, additional copies of the article entitled Third Research Residence Nears Completion, in the September issue.

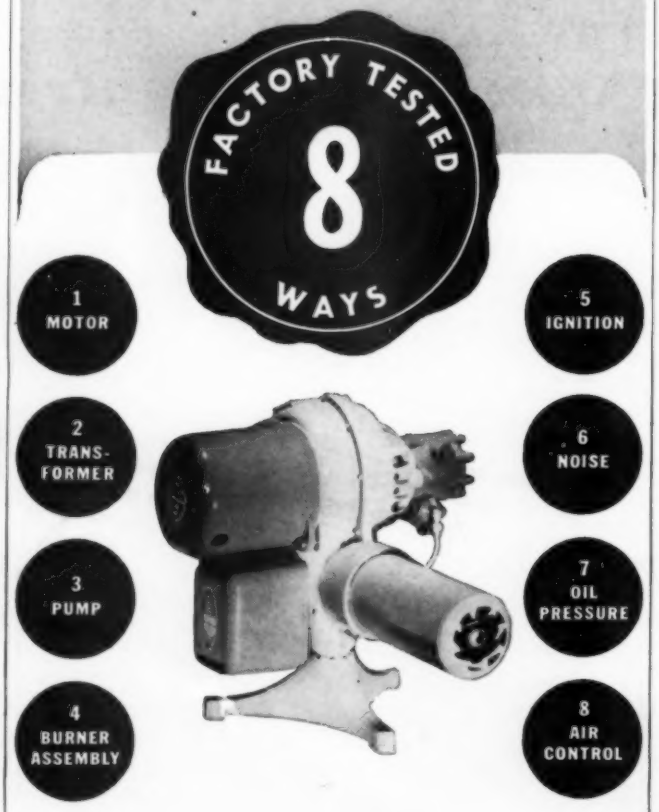
Will you kindly advise if these are available and the cost.

C. T. Wallis
Delco Appliance Div.
General Motors Corp.
Rochester, N. Y.

Address the editors
6 North Michigan Avenue
Chicago, Illinois

Salesman: *I'm a self-made salesman; that's what I am —a self-made salesman.*
Boss: *Too bad you knocked off work too soon.*

Each
Nu-Way
OIL BURNER



TO ASSURE EFFICIENT OPERATION RIGHT FROM THE START!

There's nothing more pleasant than the completion of the sale of a profitable oil burner installation. And it's an easier job when the installation is a Nu-Way. Each Nu-Way is factory tested before it leaves the plant to be sure it will operate at top efficiency right from the start. Installation problems and service calls are cut to a minimum . . . and, best of all, the customer is a "Satisfied Customer." Nu-Way Oil Burners are backed by a regular schedule of advertising in national magazines plus plenty of local sales helps. Take advantage of Nu-Way's 27 years of experience in the oil heating field. Standardize on the Nu-Way line for profit. WRITE TODAY for new folder containing facts about Nu-Way!

OIL HEATING EQUIPMENT

THE Nu-Way CORPORATION
ROCK ISLAND, ILLINOIS

Sold Through Jobbers and Distributors
Also Special Applications for Furnace and Boiler Manufacturers
"Automatic Oil Heat Exclusively Since 1921"

Team Your Production with Aluminum Sheets from Wolff Metal Service

You're sure to maintain production runs because Wolff has diversified stocks available for immediate shipment.

Aluminum sheets — Reynolds aluminum sheets — are available today at Wolff Metal Service in a wide range of alloys, gauges, sizes and tempers. Here is a resource that you can team with right now to step-up your productive capacity . . . for aluminum can be fabricated more readily, with less trouble and in less time than many other metals. You know that — but do you know how it applies to *your work* and *your equipment?*

A Wolff representative will welcome the opportunity of discussing the potential Reynolds aluminum holds for you — a potential that has provided increased volume and lowered costs for hundreds of alert midwestern fabricators of metals. Their increasing demand for aluminum has made Wolff one of the country's largest sources of supply for this incentive metal.

Wolff's complete stocks are at your service for immediate delivery. Write or phone WAlbrook 5-3200.

BENJAMIN WOLFF & COMPANY — PRIME METAL SERVICE — CHICAGO

Carbon Steels, Stainless Steels, Aluminum, Copper, Tinplate, Metal Decorating

BENJAMIN WOLFF & COMPANY

General Office and Warehouse — 5800 South Seeley Ave., Chicago 36, Ill.

Wisconsin Office — 176 W. Wisconsin Ave., Milwaukee 3, Wis.

"We find it easy and profitable to work with Stainless Steel"

—SERVCO EQUIPMENT COMPANY

ONE of the growing names in the field of fabricating food serving equipment is Servco Equipment Company, St. Louis, Mo. Most of the counters, sinks, trays, carts and other such articles made by Servco are fabricated from Stainless Steel.

Speaking for Servco, Earl J. Gates, Vice-President, points out, "We find Stainless Steel easy and profitable to work with. We like to feel that our progress and growth in recent years has been earned by building fine products of Stainless Steel. We feel it reasonable to expect continued growth in this ever-expanding field of building better products with Stainless Steel."

Servco's experience with Stainless is typical of many other fabricators serving a wide range of industries. When precision methods are applied to its fabrication, Stainless is an easy material with which to work . . . and the high standards of workmanship that it demands are carried over to other materials, increasing quality throughout the shop.

Fabricators find Stainless *profitable* to work with, too. Customer demand is high for its long life, beauty, corrosion-resistance and many other advantages. Even though the first cost of Stainless equipment is higher in some cases, users find it does so much more, does it so much better and lasts so much longer that it always costs less in the long run.

Like so many other fabricators, Servco uses a high percentage of U·S·S Stainless Steel in its operation. U·S·S Stainless possesses a uniformity in finish and in fabricating qualities that permits employment of the most advanced design and the most modern manufacturing techniques. It will pay *you* to use U·S·S Stainless, for there's no finer Stainless Steel available.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO · CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
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SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

9-1849

UNITED STATES STEEL

Announcing

A NATION-WIDE NETWORK OF AUTHORIZED SERVICE STATIONS FOR PENN AUTOMATIC CONTROLS

AUTHORIZED PENN CONTROLS SERVICE

IDENTIFIED BY THIS SIGN

Now all over the country you can get complete repair and replacement service in Penn Authorized Service Stations. Each is selected for its ability to meet rigid requirements for prompt and efficient servicing of Penn Automatic Controls.

Factory-Trained Personnel

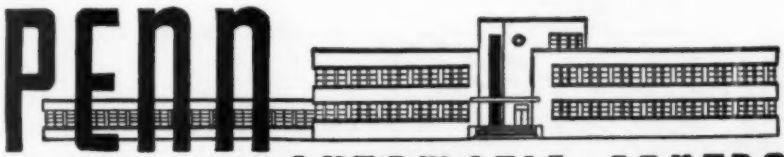
Service men in these authorized stations are given a complete and thorough course in the Penn factory. Here, working under top experts, they get actual practice repairing all types of controls. They learn to diagnose trouble quickly and make the correct adjustments or repairs to restore the controls to efficient operating condition.

Factory-Approved Equipment

In the field these service men use factory approved equipment. Penn engineers have developed and made available to them a Control Analyzer which contains all the instruments necessary for testing electrical circuits of all Penn controls, enables quick diagnosis and helps speed the work of adjustment or repair.

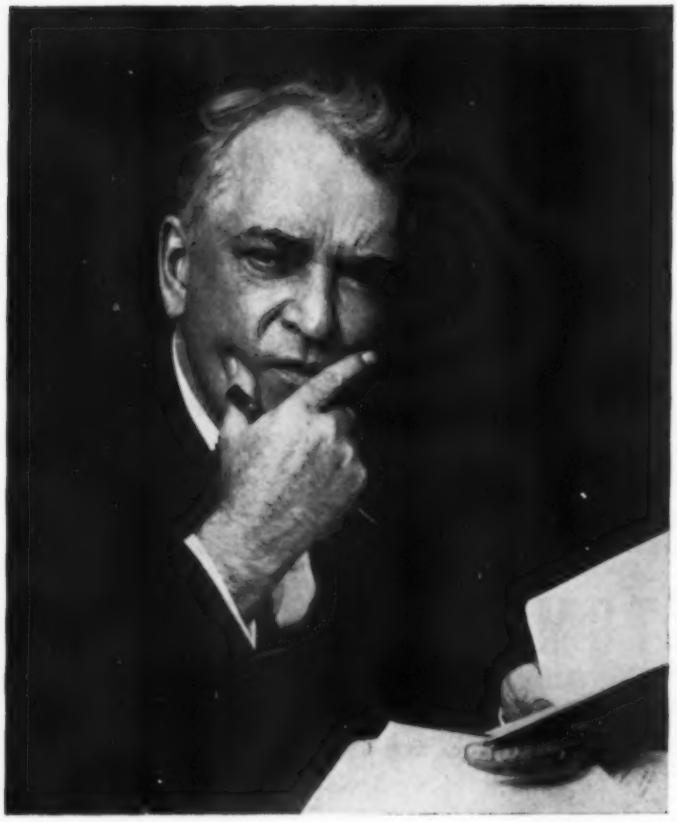
Look for the oval Penn service sign. It's where you'll get dependable, economical service by factory-trained men using factory-approved equipment. These service stations are qualified and authorized to make immediate replacements under the terms of the Penn warranty

and also under the Penn flat price replacement plan. Write for the address of the Authorized Penn Service Station nearest to you. **Penn Electric Switch Co., Goshen, Ind.** Export Division: 13 E. 40th Street, New York 16, U. S. A. In Canada: Penn Controls Ltd., Toronto, Ont.



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, PUMPS, AIR COMPRESSORS, ENGINES, GAS RANGES



"why shouldn't I

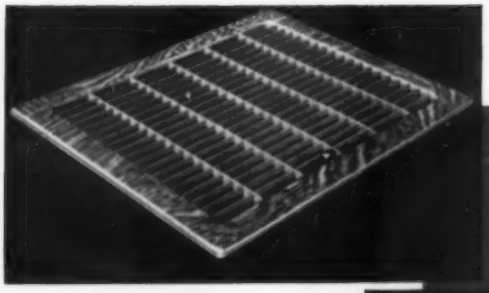
Prefer to Deal With H & C?"

"The complete line offers the ideal register for every type of installation . . . and in every detail that constitutes real quality — design, construction, careful workmanship and finish, H&C products lead the industry by a wide margin. Moreover, that *24-hour shipping service which H&C pride themselves on, assures getting the goods when you need them. Together those things provide real advantage for both the jobber and installer . . . an advantage that doesn't cost one extra cent. Why shouldn't I prefer to deal with H&C?" You, too, will find that it pays to deal with H&C. Write for copies of our current catalog No. 49 and "Pocket Guide"

** All orders for standard goods are shipped within 24 hours of receipt of order.*

NO. 210

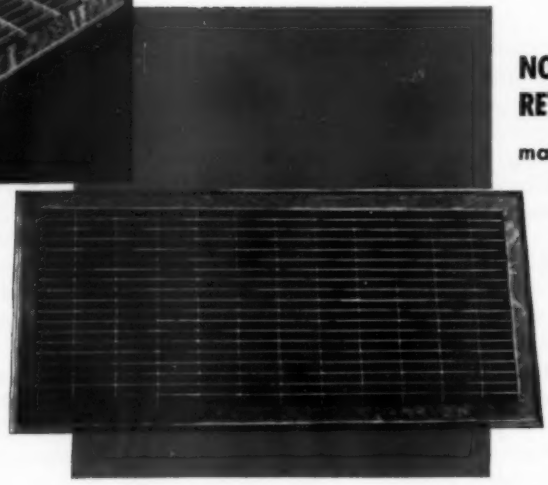
FLOOR REGISTER

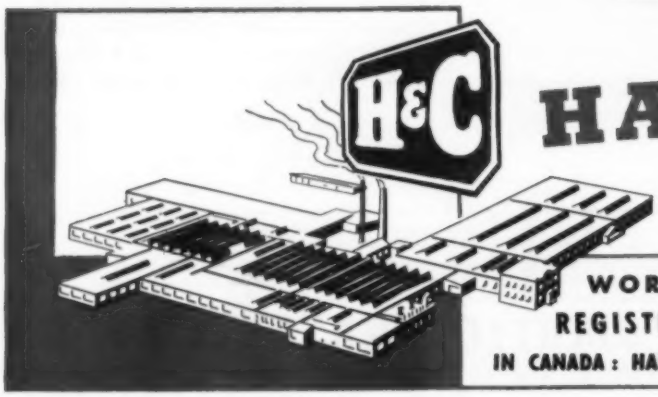


Has one-piece margin; heel-proof mesh; Multi-shutter valve; long-wearing superior finishes, including "oak" that really looks like oak. Exceptionally strong and good looking.

NO. 265
RETURN AIR FACE

matches the No. 210 in mesh and general appearance.





HART & COOLEY

MANUFACTURING CO.

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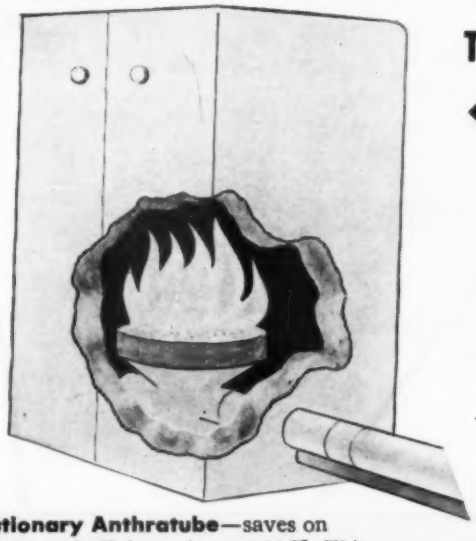
WORLD'S LARGEST MANUFACTURERS OF REGISTERS, GRILLES AND FURNACE ACCESSORIES

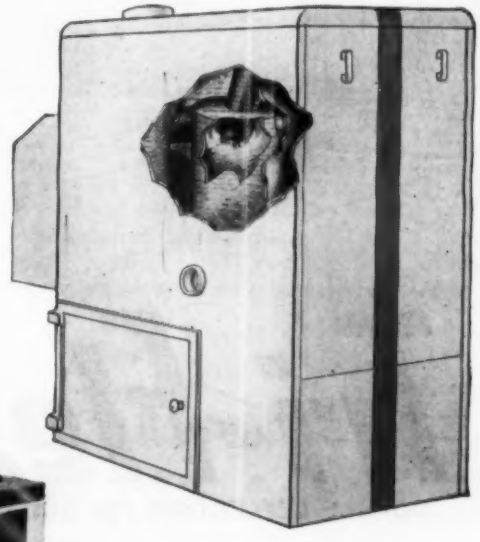
IN CANADA: HART & COOLEY MANUFACTURING CO., FORT ERIE, N. ONTARIO

Show your Clients these 3 modern Automatic Anthracite Heating Units



They save up to 52% annually on fuel bills

1. Automatic Anthracite Stokers—Installed in an existing boiler or furnace, or in new houses, automatic hard coal stokers deliver *plenty* of heat quickly . . . save up to 52% on fuel bills . . . eliminate fuel worries.



2. The Revolutionary Anthratube—saves on fuel bills . . . its proved efficiency is over 80%. This scientifically engineered boiler-burner unit, with "Whirling Heat" and other revolutionary features, produces quicker response, superior performance than units using other types of fuel. Fully automatic.

3. Anthra-Flo furnace-burner unit—An entirely new type furnace-burner which features a simple burner mechanism, attached by two bolts with all working parts easily accessible. Fully automatic, coal feeds direct from bin across single *stationary* perforated plate . . . ashes discharge by gravity into container within unit. Available for steam, hot-water and warm-air heating systems.

TODAY YOU CAN OFFER YOUR CLIENTS *modern* automatic heat with Anthracite equipment.

You can show your clients how to save money . . . as much as $100 to $200 every year and yet have *plenty of heat—clean heat—even heat*—and no worry about future supplies or deliveries.

For complete information about (1) new anthracite stokers (2) revolutionary Anthratube or (3) Anthra-Flo, just fill in and return the coupon below.

ANTHRACITE INSTITUTE
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Please send me more information on

1. New Anthracite Stokers
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3. Anthra-Flo furnace-burner unit

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Maximum Control of Air Delivery at the *Critical point*

Tri-Flex

DOUBLE DEFLECTION T64 GRILLE

In the majority of air conditioning installations, 4-way control of supply air is essential to satisfactory performance of the system. TRI-FLEX Double Deflection T64 Grilles with SANTROL Volume Controls provide a convenient means of controlling the air volume and the direction, throw and drop of the air stream to meet specific job requirements.

Be sure of your next job... specify and install the all-purpose combination that assures complete, flexible control *at the Critical Point!*

For detailed description, engineering data and size selection information for Tri-Flex Supply Grilles and Registers, Aerovane Return Grilles and Registers and T&B Air Control Devices . . . write today for a copy of Catalog No. 485.

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NEW BRITAIN, CONNECTICUT

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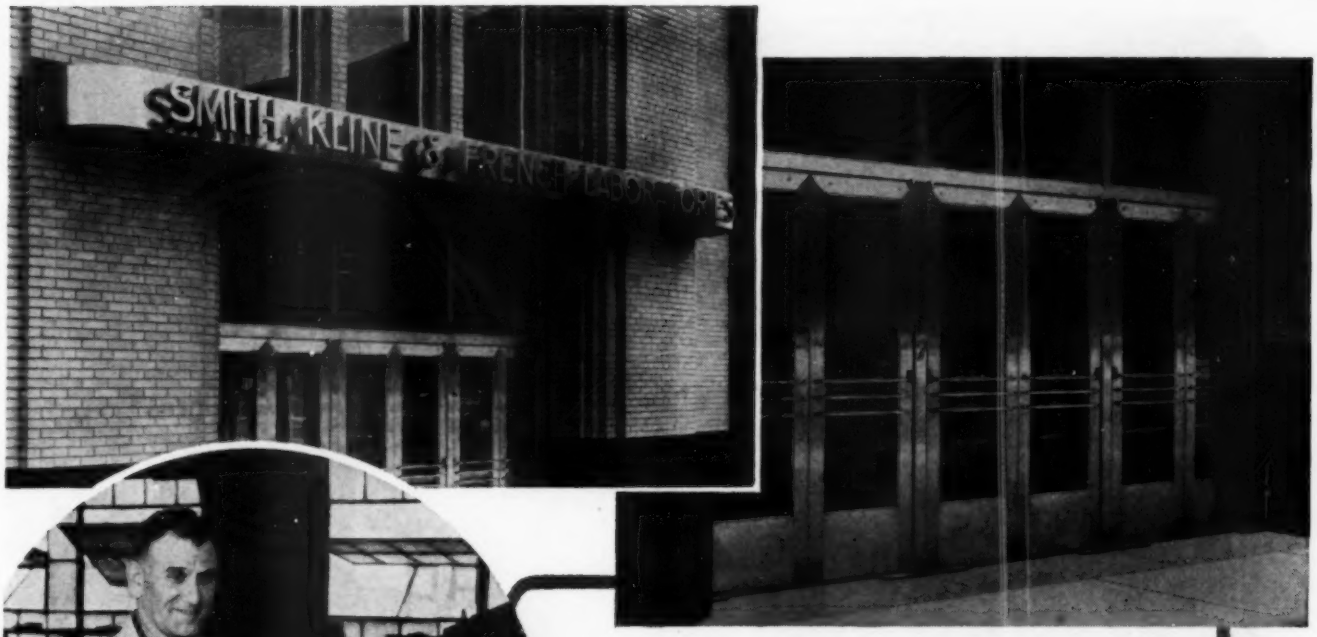

Above: Doors, cornice, letters and molding trim of the modern Smith, Kline and French Laboratories, Philadelphia, were fabricated of Republic ENDURO, TYPE 302, No. 4 finish, by George R. Habgood also of Philadelphia.

Left: Mr. Habgood in his large sheet metal shop.

PHILADELPHIA CONTRACTOR SAYS:

"My preference for Enduro dates back almost 20 years"

Mr. George R. Habgood, one of Philadelphia's leading sheet metal contractors, has specialized in architectural and ornamental work for more than 25 years. Here are his comments about Republic ENDURO Stainless Steel:

"When we first started fabricating stainless steel in 1930, it was a comparatively new and unknown metal. Consequently, we were not surprised when we encountered some difficulty in working it. We were surprised, however, and happily so, when we found that minor changes in our methods of working sheet metal made stainless steel almost as simple to use as other materials.

"Today, about half of all our work is in stainless steel—with our first choice, as always, ENDURO. Our customers seem particularly happy with the finish of stainless steel equipment . . . and because it's a permanent finish, we know that they will stay happy."

NOW is the time for you, too, to cash in on the mighty profitable stainless steel market. For valuable information about this versatile product, write *today* for your copy of Republic's FREE booklet THE FABRICATION OF REPUBLIC ENDURO STAINLESS STEEL.

REPUBLIC STEEL CORPORATION

Alloy Steel Division • Massillon, Ohio

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Export Department: Chrysler Building, New York 17, N. Y.

Enduro STAINLESS STEEL

REG. U. S. PAT. OFF.

REPUBLIC STEEL

✓ **Check ALL 12 advantages!** • RUST AND CORROSION-RESISTANCE • HEAT-RESISTANCE • HIGH MELTING POINT • LOW COEFFICIENT OF EXPANSION • HIGH STRENGTH • GOOD DIMENSIONAL STABILITY • NO METALLIC CONTAMINATION • EASY TO CLEAN • EASY TO FABRICATE • EYE APPEAL • LONG LIFE • LOW END COST

A lot of Furnace — priced right for your market

All-Welded Steel Heat Exchanger with square radiator (connected only at one point to allow free expansion without noise).

the *New* fuel-thrifty Mueller Climatrol Type 111 Gas Gravity Furnace

A low-cost furnace with these outstanding values!

① All welded steel heat exchanger and radiator — cleanable through conveniently located access panels; updraft design.
② Durable cast-iron drilled-port burner — with large single-port, non-clogging air shutter.
③ Heavy-gauge steel cabinet finished in handsome Mueller green — lined with asbestos insulator laminated to aluminum foil.
④ Solid steel base — with four adjustable leveling screws for easy installation.
⑤ Compact, easy to handle, space-saving — dimensions: 31" high, 25½" wide, 26½" deep. (Available with pitch-type bonnet.)
⑥ Shipped completely assembled — arrives in two packages: one for burner and trim, the other for assembled heat exchanger and cabinet.
⑦ Approved by American Gas Association — for all gases and high-altitude installation with full rating.

Compact 90,000 Btu steel gas furnace priced to compete in the low-cost small-homes market without sacrificing Mueller design or quality

Here's what you've been waiting for — a top quality, nationally famous Mueller Climatrol . . . designed to put you in line to get a bigger share of the thousands of small homes going up today.

The Type 111 is shipped pre-assembled to save setting-up time; it is only 25½" wide, easily goes through any door; has a solid base with leveling screws to eliminate concrete setting and grouting.

Yes, the Type 111 is your best bet for getting all the business you can handle from the new, small-homes market.

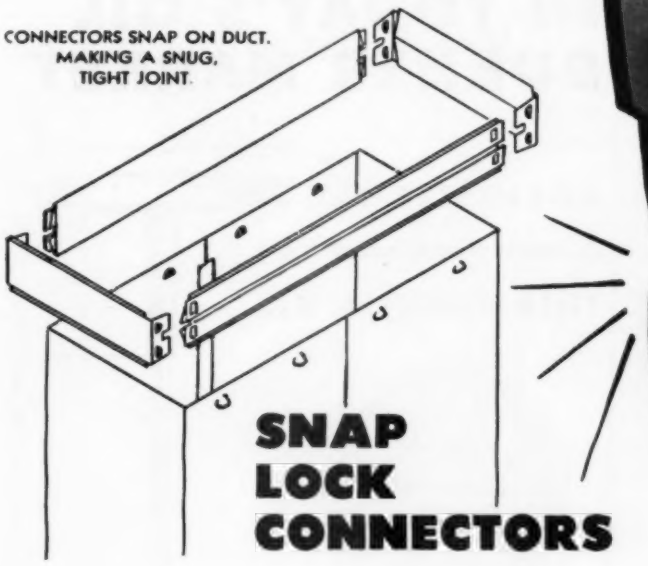
Order a display model, and stock to meet your immediate needs. It moves fast in a market hungry for low-cost values. Write for details: L. J. Mueller Furnace Co., 2010 W. Oklahoma Ave., Milwaukee 15, Wis.

MUELLER Climatrol

REG. U.S. PAT. OFF.

D-103A

Great Idea for FURNACE PIPE & FITTINGS



SNAP LOCK CONNECTORS

Snaplock connectors are a patented Lamneck exclusive. Just push, and they snap together quickly and easily, making a smooth, tight joint — far superior to the clumsy, time-consuming S-hook and drive-cleat type connection. Snaplock connectors — one more example of Lamneck's outstanding engineering advantages.

Whether you require rectangular or round duct, or whether you're installing forced air* or gravity systems, Lamneck jobs figure faster, sell faster, finish faster — and that adds up to extra profits for you.

*P.S.: Remember, only Lamneck has the exclusive Simplenic System for forced air. Saves up to 25% by eliminating need for increasers or reducers on the main trunk. Get the facts! Write for catalog and name of your nearest jobber.

Simplenic* SYSTEM
T.M.
Lamneck
FURNACE PIPE & FITTINGS

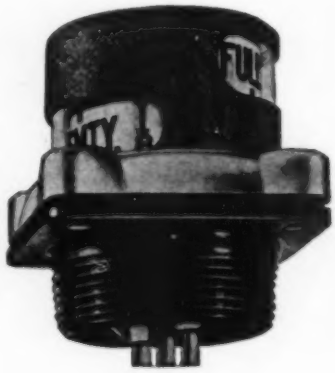
CLAYTON & LAMBERT MFG. CO.
LOUISVILLE 10, KENTUCKY

LAMNECK ANOTHER GREAT C&L PRODUCT

Goodwill Builders...

IN TODAY'S OIL BURNER MARKET

Dual-Dial Safety Oil Tank Gauge



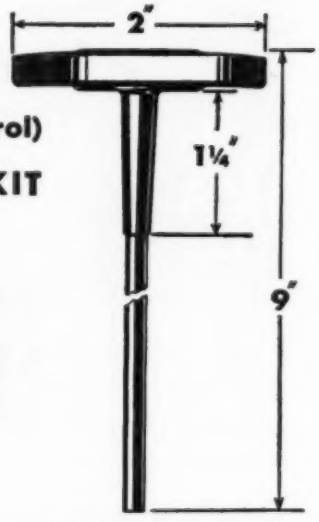
When you install Rochester Oil Tank Gauges—you cash in on over 25 years of specialized manufacturing experience. Progressive dealers everywhere have consistently enjoyed trouble-free gauging for over a quarter century. Here's why...

DUAL-DIALS are tops because...

1. **They are leakproof—no fumes—no spilled oil (even under pressure)—no personal liability to worry about.**
2. **They are accurate—drivers and customers see "eye to eye"—no billing complaints.**
3. **They are safety built—Underwriter listed for over 25 years.**

Don't wait 'til too late! The sooner your jobber knows your wants, the sooner you'll get delivery. Dual Dials are priced right. The market is right. Stock up now.

ROCHESTER CAC (Circulation Air Control) THERMOMETER KIT



Here is a new Rochester kit which enables you to *accurately* balance air temperature in any type of forced air heating unit. Consisting of 3 sturdy stainless steel thermometers, you can insert them in warm air duct, return air duct and near blower switch all at one time. The tapered bushing fits the hole snugly, thus permitting free hands to make adjustments quickly and accurately.

Want more details? Sign and mail coupon!

ROCHESTER MANUFACTURING CO., INC.
66 ROCKWOOD STREET, ROCHESTER 10, N. Y.

Please send ☐ Literature and prices on Dual Dial Gauges
☐ Literature and prices on Air Circulation Control Kit.

Name .....

Company .....

Address .....

City ..... Zone ..... State .....

Rochester

THERE'S A Gilbarco OIL BURNER FOR EVERY HEATING JOB

No need to pass up any kind of business when you handle the Gilbarco line. You've got a burner to fit every oil heating job. With six models of gun-type burners from ¾ to 25 gallons per hour, plus industrial burners from 15 to 110, you can sell a Gilbarco installation that will do the work and do it superlatively well — whether it's a speculative builder's development of four-room houses or a five-hundred-room hotel.

MODEL GBS — Low priced for the builder market, but a completely reliable, *famous-name* burner.

MODEL GCN — For the large volume home-owner market. A distinctive new model featuring top performance, greater accessibility and improved protection.

MODEL GC1 — For large homes and small commercial buildings which require from 2 to 4.25 gallons an hour.

MODEL GC3 — A burner for the extensive commercial field which uses from 5 to 10 gallons an hour.

MODEL GC4 — This is for the larger commercial and industrial jobs which need 9 to 14 gallons an hour.

MODEL GC5 — For large buildings and industrial installations firing No. 2 oil at 12 to 25 gallons an hour.

HEAVY OIL MODELS — Fully automatic, semi-automatic and manual models firing Nos. 4, 5 and 6 oils at 15 to 110 gallons an hour.

And remember, all GC models are equipped with the patented and exclusive Economy-Clutch action—still the most powerful sales feature in the gun-type burner field today!

Line up with a complete burner and unit line that opens up to you the *whole* field of oil heating. Several valuable dealer franchises are open west of the Appalachians. A letter, wire or phone call will bring you complete information—fast!

WARM AIR CONDITIONERS—SUSPENDED & SURFACE FURNACES—CAST IRON & STEEL BOILERS

Gilbarco

THE OIL BURNER WITH THE ECONOMY CLUTCH

GILBERT & BARKER MFG. COMPANY

WEST SPRINGFIELD, MASS., AND TORONTO, CANADA

it pays to push

DETROIT CERTIFIED CONTROLS

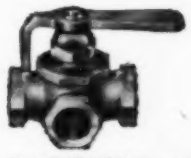
Add EXTRA Profits to Every Oil Heater Sale

You're not the only one who profits when you sell space heater buyers these vital extras—DETROIT Certified Controls. Your customers benefit, too, because the added comfort and convenience they enjoy pays the difference many times over. DETROIT Certified Controls give the users of oil burning space heaters and floor furnaces clean, simple control of fuel storage and transfer, as well as completely automatic temperature regulation. And, like all DETROIT products, these controls are Certified. This means extra protection, extra profits for you—now and in the future. Another reason why it always pays to push DETROIT Certified Controls.

Sell these important EXTRAS!

Detroit No. 411-PH Thermostat — Provides accurately leveled temperature control.

Detroit CRC-239-P and CRC-239-PF Add-On Controls—For operation of space heaters and floor furnaces.



Detroit CRC-520 Three-Way Valve—Saves cost by operating with either of two tanks.

Detroit CRC-433 Fuel Transfer Pump—Supplies fuel automatically from main tank.

DETROIT

LUBRICATOR COMPANY

5900 TRUMBULL AVE., DETROIT 8, MICHIGAN

Division of American Radiator & Standard Sanitary Corporation

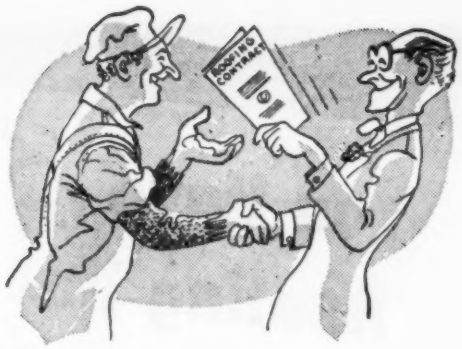
Canadian Representatives: RAILWAY & ENGINEERING SPECIALTIES, LTD.—Montreal, Toronto, Winnipeg

DETROIT

DETROIT HEATING AND REFRIGERATION CONTROLS • ENGINE SAFETY CONTROLS • FLOAT VALVES AND OIL BURNER EQUIPMENT • DETROIT EXPANSION VALVES AND REFRIGERATION ACCESSORIES • STATIONARY AND LOCOMOTIVE LUBRICATORS

Serving home and industry AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

You get *BIG* jobs... and more of them...when you know the facts about...



EASY-WORKING SOFT TEMPER "MONEL" ROOFING SHEET

WORKER EXAMINES an assortment of Monel roofing parts fabricated by Limbach Company, Pittsburgh, Pa. Installed on a chemical manufacturing plant, these Monel gutters, flashings, downspout straps and eaves boxes are successfully resisting destructive fumes, smoke and lowland dampness.

ON THIS JOB in Detroit, Michigan, Monel batten pans are being cleated down with Monel clips by a Wallace Candler, Inc., roofer. Monel Roofing Sheet made possible a substantial reduction in sheet thickness.

FOR PERMANENT PROTECTION, old gutters on this building were replaced with gutters of corrosion-resistant, economical Monel Roofing Sheet. Photo shows worker soldering a riveted seam in gutter lining. Fabricator, Rupertus Sheet Metal Works, Washington, D. C. reports: "Some of the gutters were 55" in girth, but Monel was easy to work with and install".

How large a portion of your business is in profitable big roofing jobs? Public buildings, hospitals and factories represent eight, ten, twelve or more weeks of steady work. Do you want to know how to get more of this business?

Learn all the facts about the new easy-working, soft temper MONEL® Roofing Sheet. This economical nickel-copper alloy is being written into more and more specifications for large buildings, where "life-of-the-building" roof service and minimum maintenance costs are required.

Once you're ready to bid on Monel jobs, you get more big roofing jobs. Monel Roofing Sheet is used more for these jobs than for any other type of work.

Economical Protection

And there is good reason why Monel should be specified for these big jobs. For one thing, a Monel roof can be designed, fabricated and applied at a reasonable cost...in fact, the cost is surprisingly low. That's because the superior corrosion resistance of Monel Roofing Sheet, together with its high strength and low rate of heat expansion, often make it possible to use thinner gauge sheet.

On several recent jobs, Monel's excellent properties permitted a reduction of 25% in thickness for batten seam roofing. Even greater reductions have been made in louvers, flashings, gutters and leaders.

So go after Monel jobs! It's an easy way to make BIGGER jobs a larger part of your business.

Easily Fabricated

And there's still another important advantage in Monel Roofing Sheet for you—the ease and quickness with which it can be cut, bent, formed, seamed and soldered. Roofers say it's a cinch to work with—especially because it can bend around sharp corners and intricate forms without cracking.

Send for Test Sample

You can prove all this to your own satisfaction. Get a free test sample—and put it through its paces. You'll agree that Monel has everything you want in a roofing metal.

With your test sample, we'll also send our two new bulletins, *Monel Roofing Sheet—Basic Application Data* and *The Soft-Soldering of Monel Roofing Sheet.* The first reviews the properties and characteristics of Monel Roofing Sheet, tells how to use it to best advantage, gives information about cost, and discusses installation methods. The second covers soft-soldering for principal sheet metal building jobs.

You'll find both bulletins helpful. And you can get them—along with your test sample of Monel Roofing Sheet—by just sending us the coupon below. Mail it—*now*.

EMBLEM OF SERVICE INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street, New York 5, N. Y.

*Reg. U. S. Pat. Off.

Mail this coupon for FREE test sample and helpful bulletins!

Architectural Section
The International Nickel Company, Inc.
67 Wall Street, New York 5, N. Y.

I want to know more about Monel Roofing Sheet so that I can bid on those big jobs you talk about. Please send me a free test sample of Monel Roofing Sheet and your two new bulletins.

NAME.....

AA-11-49

STREET.....

CITY.....ZONE.....STATE.....

MONEL*... *for the life of the building*

You Have *3 Choices* of Heating Installations with MONCRIEF'S NEW GAS or OIL *Counterflow* Utility Air Conditioning Units

Moncrief Counterflow Air Conditioning Units are designed especially for basementless home construction that employs a floor slab.

The unique "Years Ahead" design and compact construction of these units with blowers mounted in the top of the cabinet permits the warm air to be discharged downward into the pit or plenum chamber provided in or below the concrete slab floor.

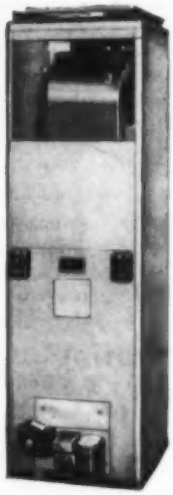
Moncrief Counterflow units are factory assembled ready for the installation of either a Moncrief Gas Burner or a Moncrief Vaporizing Oil Burner. You get equally efficient heat with either a Gas or an Oil Installation.

1 For the house with floor panel heating – warm air ducts imbedded in the concrete slab floor.

2 For the house with warm air ducts installed in the crawl space under the concrete slab floor and above the ground.

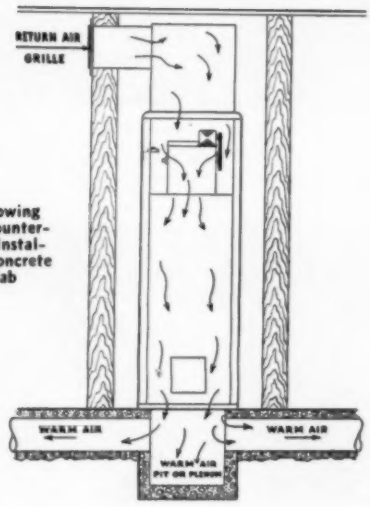
3 For the house with warm air ducts imbedded in the concrete slab floor, but discharging into floor or wall registers.

Interior view of Counterflow unit with Moncrief Gas Burner installed



No. VUC-75-E, Oil Counterflow Air Conditioning Unit 75,100 BTU at Discharge Outlet

No. GUC-95-E, Gas Counterflow Air Conditioning Unit 76,000 BTU at Discharge Outlet



Sketch showing compact Counterflow Unit Installation on Concrete Floor Slab

THE HENRY FURNACE COMPANY

Medina, Ohio

HEATING AND AIR CONDITIONING UNITS — MONCRIEF — FURNACE PIPE AND FITTINGS

For SHEAR Satisfaction

NOW AND IN YEARS TO COME

DEMAND

Time Tested **RIGID** CONSTRUCTION

ASSURED BY HI-TENSILE CASTINGS

MAINTAIN ALIGNMENT

Castings provide the rigidity *necessary to maintain alignment* of a shear's essential parts—tables, knife bars, hold-downs and end frames.

Castings reduce deflection to a minimum. That is why many shears that are still doing a good job after service of more than a quarter century were made of castings.

That is why Wysong & Miles sticks to sturdy, heavily ribbed, Hi-Tensile castings for RIGID CONSTRUCTION —even in their foot operated shears.

That is why you can depend on Wysong & Miles Shears to maintain alignment for accurate, straight line, burr-free shearing.

CHARACTERISTICS OF GRAY IRON CASTINGS

Power to dampen vibration 10 times that of steel.

Resistance to compression nearly twice that of steel.

Wear resistance outstanding — hence their use for nearly all cylinder heads, machine tool ways, etc.

With the same dimensions, deflection is 1/4 to 1/5 that of steel weldments.

(The heavily ribbed, rigid castings of Wysong & Miles shears reduce deflection to a minimum)

FOR FURTHER INFORMATION SEE YOUR DEALER OR WRITE FOR NEW CATALOG NO. 33

WYSONG and MILES Co. GREENSBORO, NO. CAROLINA

For ALUMINUM
that gives you more and can cost you less . . .

SYMBOL OF SERVICE

THERE ARE many reasons why it's to your advantage to look to us for all your aluminum needs. Here are a few of them:

1. **You get Reynolds Lifetime aluminum that's guaranteed as to uniformity of size and thickness; of alloy, temper, and other physical characteristics.**
2. **You know that you are obtaining your aluminum from a well-known, dependable source.**
3. **You have the assurance that your aluminum will be packaged carefully. Thus, the contents will arrive undamaged—without water stains, bending of material, injury to corners, or surface scratches.**
4. **You have the additional valuable advantage of our metallurgical advice and assistance in problems of application.**

And, what's very important, we can show you how it can cost you less when you place your orders for aluminum with us. So, whenever you need aluminum, remember that your best source of supply is United States Steel Supply. For prompt, courteous service, just phone, wire or write the warehouse or sales office nearest you.

UNITED STATES STEEL SUPPLY COMPANY

Warehouses: BALTIMORE · BOSTON · CHICAGO
CLEVELAND · LOS ANGELES · MILWAUKEE · MOLINE, ILL. · NEWARK · PITTSBURGH
PORTLAND, ORE. · SAN FRANCISCO · SEATTLE · ST. LOUIS · TWIN CITY (ST. PAUL)
Also Sales Offices at: KANSAS CITY, MO. · PHILADELPHIA · TOLEDO · TULSA · YOUNGSTOWN
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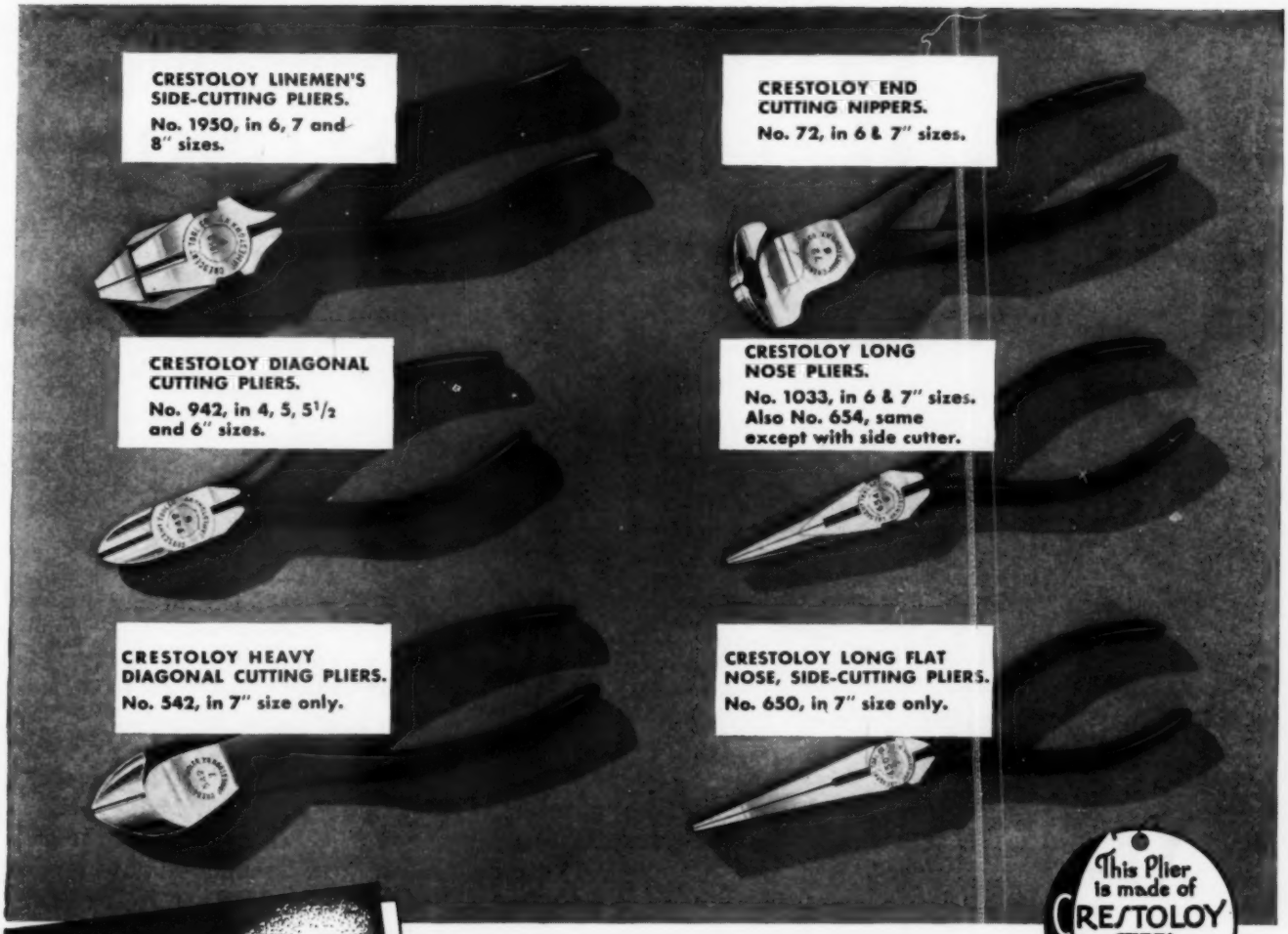
UNITED STATES STEEL


CRESTOLOY LINEMEN'S SIDE-CUTTING PLIERS.
No. 1930, in 6, 7 and 8" sizes.
CRESTOLOY END CUTTING NIPPERS.
No. 72, in 6 & 7" sizes.
CRESTOLOY DIAGONAL CUTTING PLIERS.
No. 942, in 4, 5, 5 1/2 and 6" sizes.
CRESTOLOY LONG NOSE PLIERS.
No. 1033, in 6 & 7" sizes. Also No. 654, same except with side cutter.
CRESTOLOY HEAVY DIAGONAL CUTTING PLIERS.
No. 542, in 7" size only.
CRESTOLOY LONG FLAT NOSE, SIDE-CUTTING PLIERS.
No. 650, in 7" size only.

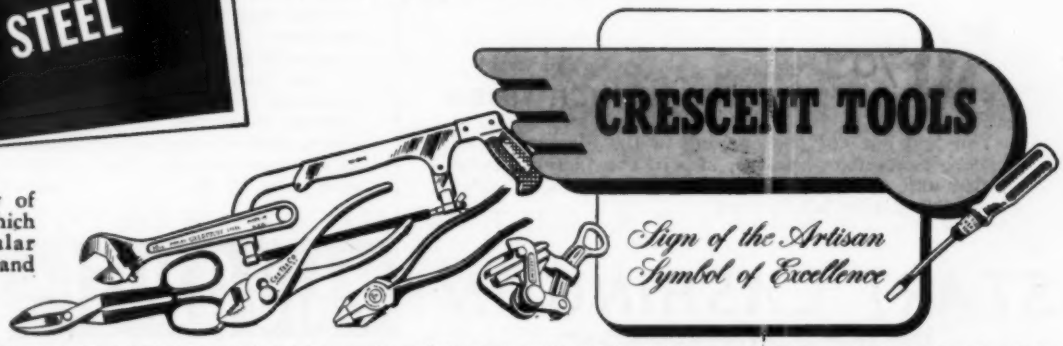
This Plier is made of CRESTOLOY STEEL and has tested 100% satisfactorily

CRESTOLOY PLIERS

are individually tested!

Crestoloy Pliers take all the guesswork out of plier buying, because Crescent has taken all the guesswork out of plier making. Rigid specifications establish the material, design, workmanship, tests and inspection of these better tools. Strict adherence to these specifications is maintained by continuous tests and relentless inspection of the *individual* tools. Every plier carries the Crestoloy tag certifying that it has been individually tested.

Write for your copy of this little folder which illustrates 21 popular patterns of Crescent and Crestoloy Pliers.



"Crescent" is our trade-mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by

CRESCENT TOOL COMPANY, JAMESTOWN, NEW YORK

NEVER BEFORE

AN AUTOMATIC HUMIDIFIER WITH THESE COMFORT-ECONOMY ADVANTAGES

MAID-O'-MIST Convector Humidifiers

Designed for fast and efficient evaporation of water, Maid-O'-Mist's narrow, individual troughs for each evaporator pad do not restrict the flow of heated air. Available in 13 different sizes, these humidifiers have evaporation capacities of 1 to 10 gallons of water per day. Made entirely of non-ferrous metal and equipped with automatic (float operated) supply valve.

60% LESS AIR RESTRICTION IN THE PLENUM—

The individual, narrow troughs have a minimum of air flow restriction which permits their use in small plenums. Result—heating efficiency, a boost to your professional reputation.

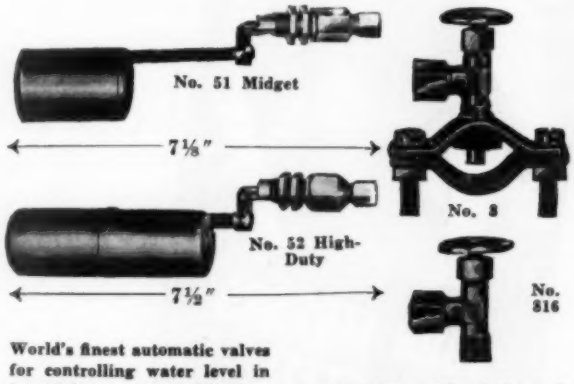
30% MORE EVAPORATING AREA—

Fast continuous humidification even at low furnace temperatures or when the thermostatic control temporarily cuts off. Result—satisfied customers, more business for you.

50% LESS INSTALLATION TIME—

You just cut out the opening in the plenum, attach the plenum flange frame, slip in the factory-assembled unit and make the water connections. A quick, easy profitable job for you.

MAID-O'-MIST BRASS FLOAT VALVES AND SADDLE VALVES FOR THAT INSIDE JOB



World's finest automatic valves for controlling water level in humidifiers, air conditioners, evaporative coolers, air washers, etc. Easy thumb screw adjustment permits raising or lowering water line as required. Capacity sizes from 1 qt. to 1½ gals. per min. Pressures up to 125 lbs.

Saddle Valves (No. 8) for ½" and ¾" iron pipe. Each consists of machined brass forgings with insert tube to fit ¼" hole, and with brass wheel handle. Needle Valves (No. 816) control water supply to humidifier and feed valves.

START CASHING-IN ON THESE DIVIDENDS NOW!

See your jobber or write for attractive prices.

MAID-O'-MIST INC.
3213 N. Pulaski Road
Chicago 41, Illinois

AUTOMATIC HUMIDIFIERS FOR ALL TYPES OF HEATING SYSTEMS

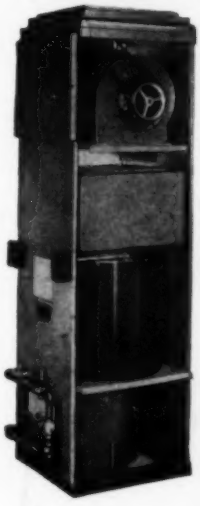
For the Home Without a Basement

Luxaire's NEW

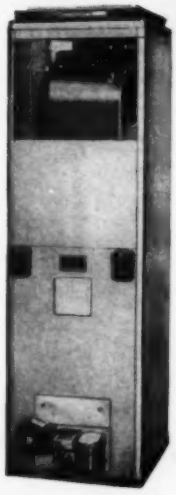
Counterflow Air Conditioning Units

For Either Gas or Oil

Interior view of Counterflow unit with Gas Burner installed



No. GHC-95-E, Gas Counterflow Air Conditioning Unit 76,000 BTU at Discharge Outlet



No. VHC-75-E, Oil Counterflow Air Conditioning Unit 75,100 BTU at Discharge Outlet

Luxaire Counterflow units provide low cost, efficient heating installations in homes where ducts are embedded in, or placed under a concrete slab floor.

Installation is easy and quick. With the blower installed in the top of the cabinet, the unit is placed directly over a pit or plenum chamber, provided in the floor slab. When the furnace operates, warm air is discharged downward through the unit into the pit or disbursing chamber provided in the concrete slab floor.

Luxaire Counterflow units are designed and constructed to burn either Gas or Oil and provide highly efficient results with either fuel.

These units are factory assembled and shipped ready for the installation of either the Luxaire Multi-port, Gas Burner or Luxaire Pressure Vaporizing Oil Burner.

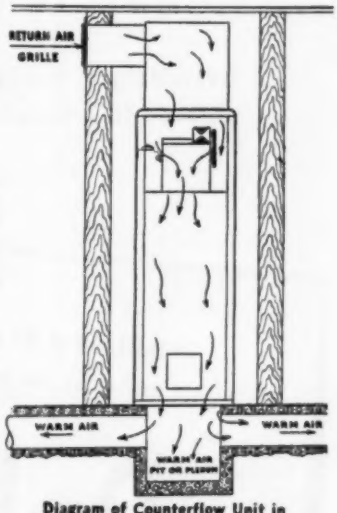


Diagram of Counterflow Unit in building with Concrete Slab Floor

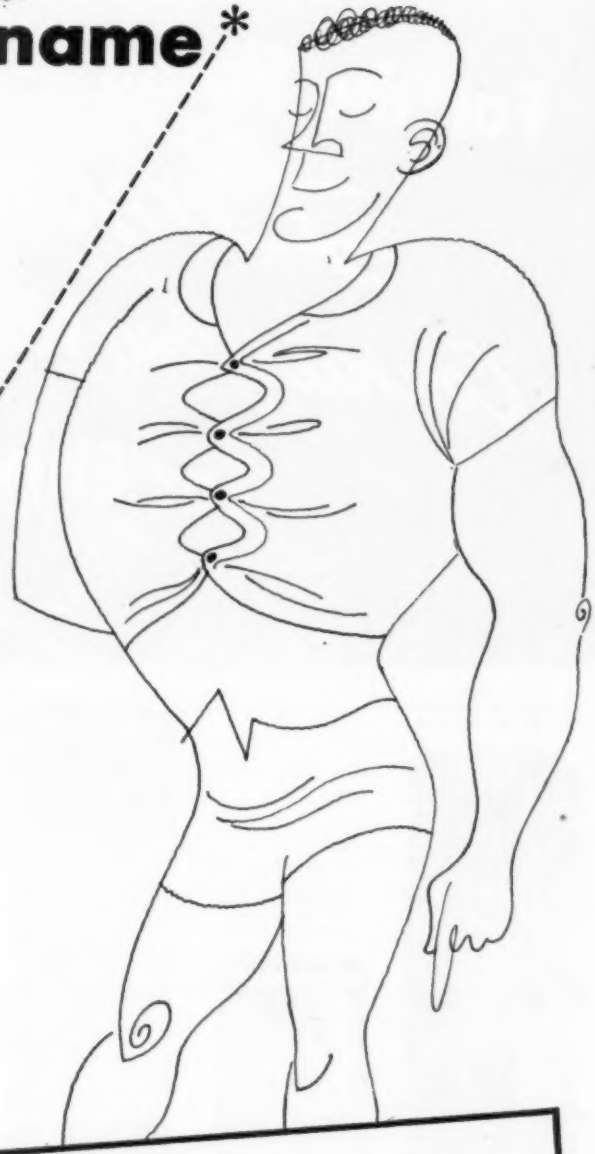
THE C·A·OLSEN MANUFACTURING COMPANY

Luxaire HEATING & AIR CONDITIONING UNITS

ELYRIA, OHIO

Polyken®

...is my *new* name*



Everybody outgrows his britches sometime. I did it faster than most . . . thanks to your ever-increasing demands for Bauer & Black industrial tape.

So now I'm getting a new name . . . and clothes that fit. In other words . . . we've formed a new department with separate headquarters . . . under our own trade name . . . POLYKEN.

As new uses for industrial tapes are developed, we will continue to add specialty and standard tapes to our already broad line. And as an expanded department, we want to continue helping you in industry to cut costs . . . speed and improve methods.

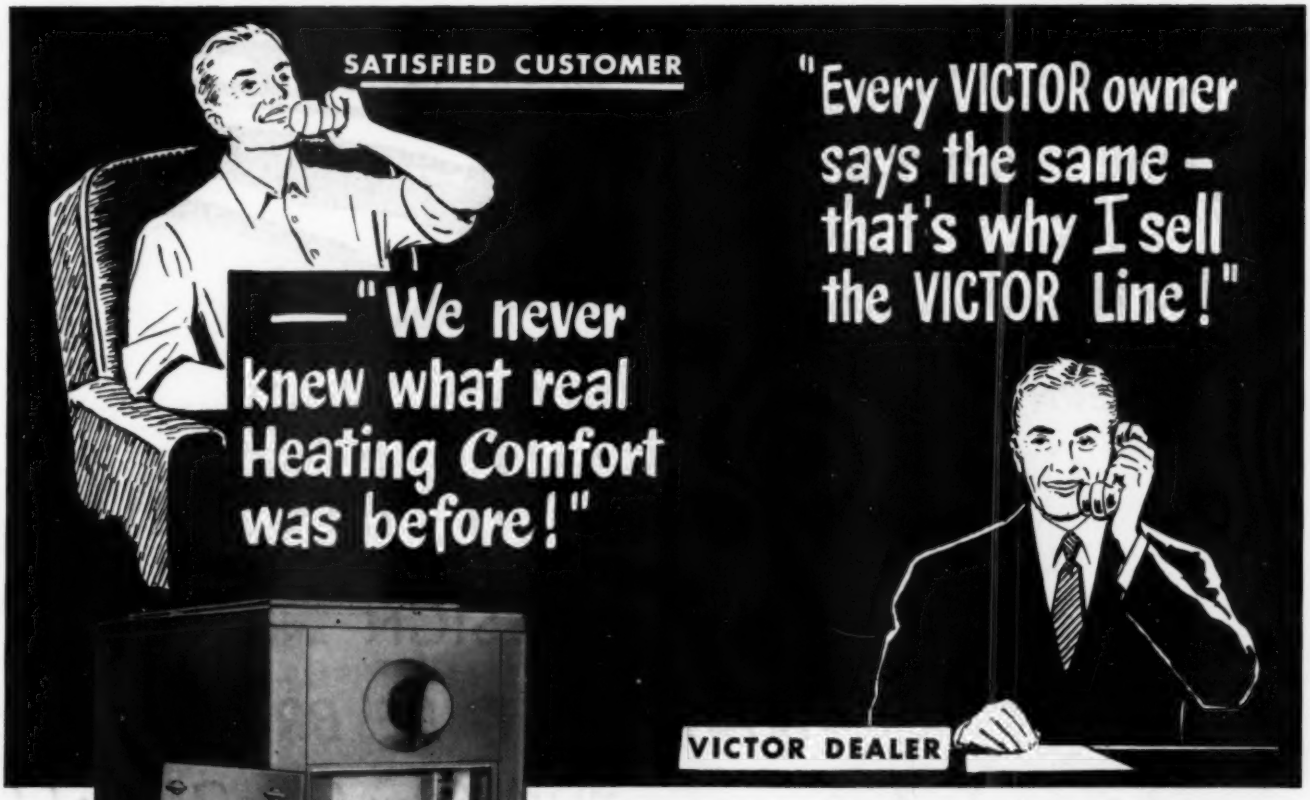
Accordingly, Bauer & Black is pleased to announce that . . .

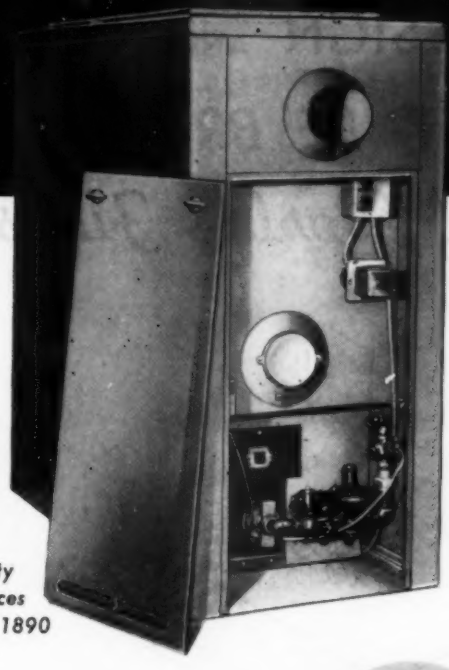
***BAUER & BLACK Industrial Adhesive Tape** will now be sold under the following trade name:

Polyken®
INDUSTRIAL TAPE

DEPARTMENT OF
BAUER & BLACK
DIVISION OF THE KENDALL COMPANY
222 W. ADAMS ST., CHICAGO 6

Dozens of POLYKEN tapes for hundreds of diversified jobs.


SATISFIED CUSTOMER
— "We never knew what real Heating Comfort was before!"
"Every VICTOR owner says the same — that's why I sell the VICTOR Line!"
VICTOR DEALER



Quality Furnaces Since 1890

THEY THANK YOU FOR SELLING THEM A . . .

VICTOR

FURNACE FOR COAL, GAS OR OIL

Yes, there is real satisfaction, as well as profit, in selling a VICTOR. It's like selling a man a life insurance policy which gives his family protection as long as they live. You are insuring him, as well as his family, a lifetime of the finest heating comfort money can buy.

The VICTOR line, noted for quality for over 50 years, is complete. The line's many exclusive features, including fuel-saving FINS, take you out of the competitive class, whether it's coal, gas or oil.

It's the furnace **WITH FUEL SAVING**

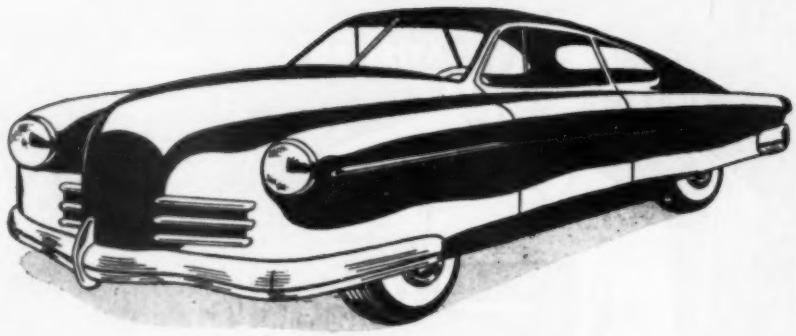
Write us . . . New Accounts Are Being Added. Increase Your Profit With VICTOR TODAY!

HALL-NEAL FURNACE CO.

VICTOR *Quality Furnaces Since 1890*

1322-1332 N. CAPITOL AVENUE - INDIANAPOLIS 7, INDIANA

In STURDIER FASTER - BETTER AUTOMOBILES



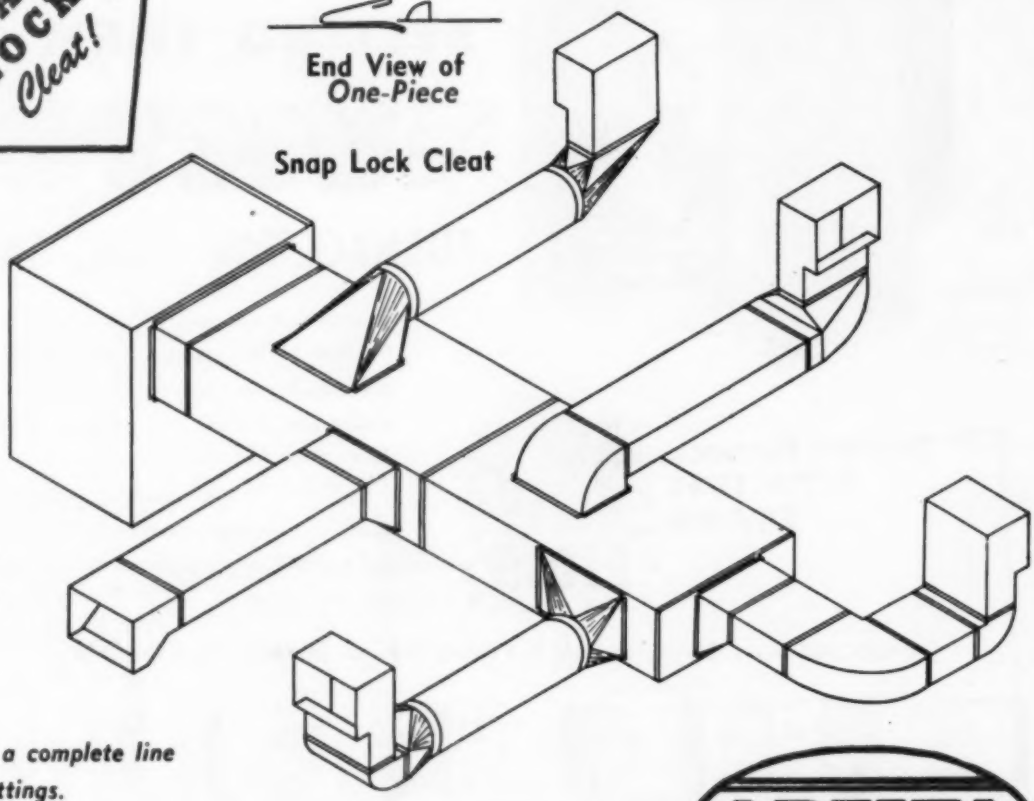
OR MODERN • COMPACT • EFFICIENT

AIR CONDITIONING FITTINGS

MODERN DESIGN AND *MANUFACTURE BRING YOU THE World's Finest!*

All Ducts and Fittings EQUIPPED WITH ADELTA Exclusive One-Piece Tapered Edge **SNAP-LOCK** *Cleat!*

End View of *One-Piece* Snap Lock Cleat



DEALERS...

Investigate the complete ADELTA line of Air Conditioning Ducts and Fittings.

Send for catalog today. Sold through leading jobbers everywhere.

Also manufacturers of a complete line of furnace pipe and fittings.

ADELTA

ADELTA MANUFACTURING CO. INC.
21st and Ellsworth Sts., Phila. 46, Pa.

QUALITY, TOO, IS MORE THAN SKIN-DEEP

Weirzin

ELECTROLYTIC ZINC-COATED SHEETS AND STRIP

Conspicuous in its flawless surface is Weirzin's electrolytically deposited coating of malleable zinc. And that's all you're likely to see of Weirzin, for—even after deep drawing—the zinc remains intact, forming an impervious protective coating, safe from underfilm corrosion.

But the quality of Weirzin is more than skin-deep. Beneath its zinc coating is Weirton's own cold-rolled steel, noted for its ductility, uniformity of gauge, and adaptability to drawing and forming operations.

Weirzin, in short, enables you to make better products—and with appreciable manufacturing economies.

WEIRTON STEEL CO.

WEIRTON, W. VA., *Sales Offices in Principal Cities*

Division of NATIONAL STEEL CORPORATION, *Executive Offices, Pittsburgh, Pa.*

NIAGARA

Announces a New, Low-Priced

POWER SHEAR FOR LIGHT SHEET METAL

● Here is the new high speed Power Shear that sheet metal men have been waiting for. New advanced engineering... new styling ...new, easy, fast operation.

THE GREATEST DOLLAR *for* DOLLAR SHEAR VALUE YOUR MONEY CAN BUY

● This new Niagara high speed Power Shear is designed for light sheet metal work. One look at its distinctive styling indicates its modern performance.

Fabricated from unbreakable steel plate, it is engineered to combine strength and stiffness for accurate cutting.

Clear visibility of cutting line through cut-outs and over the top of holddown facilitates shearing to an accurate layout line.

Niagara Alloy Tool Steel Knives heat treated to a high degree of hardness and toughness and precision ground for accuracy provide keen cutting edges for longer service between grinds.

Quick Acting Back Gauge and convenient front and side gauges.

Capacity—20 gauge.

30, 36 and 42 inch cutting lengths

125 cuts per minute.

Write for complete information and low prices

See how the new PANCAKE MOTOR DRIVE provides the most compact construction ever obtained...minimum floor space, maximum safety.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, NEW YORK

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK

t

AL

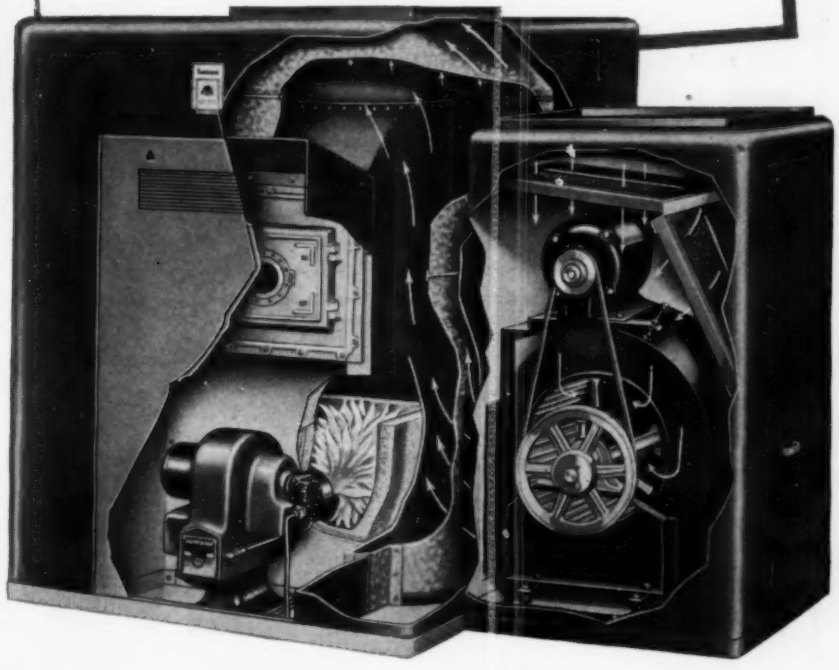
RK

AMERICAN-Standard

First in heating . . . first in plumbing

The WESTMORELAND

oil fired Winter Air Conditioner



Inside the good-looking jacket of the Westmoreland are all the engineering and construction features that make for efficient, economical performance. A tightly constructed heating element of heavy boiler plate steel insures maximum heat output and prevents escape of fumes; an extra large radiator provides unusually long fire travel and additional heating surface to further increase unit's efficiency.

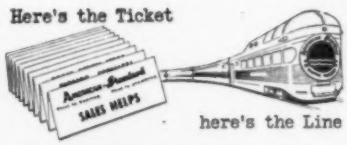
For virtually any size home

■ Here's a quality winter air conditioner that's as attractive in appearance as it is efficient in performance. And, because it comes in five sizes, ranging from 150,000 to 330,000 Btu at register, it meets the requirements of homes of almost any size. Engineered exclusively for oil firing, the Westmoreland is available as a coordinated unit with the famous Arcoflame Oil Burner, or you can sell it for use with any other good burner.

The Westmoreland is but one of the many Sunbeam warm air units in the complete American-Standard line. For details, contact your Wholesale Distributor. And, remember, when you feature American-Standard products, you not only sell the finest quality that money can buy, but you also receive a full measure of advertising and merchandising support. **American Radiator & Standard Sanitary Corporation,** P. O. Box 1226, Pittsburgh 30, Pa.

Look for this AMERICAN-STANDARD HEATING PIPING *Mark of Merit*

Here's the Ticket



here's the Line

-to better business in '49!

When you sell American-Standard products you get all the selling aids you need to bring in more business. Ask your Wholesale Distributor for details of this powerful new advertising and merchandising program.

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

Schaefer BRUSHES

FOR PLUMBERS...FURNACE MEN...HEATING CONTRACTORS

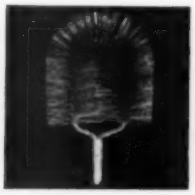
Performance tested, SCHAEFER Brushes offer longer wear, better service, greater value—with the *correct* brush for every industrial and domestic use.

SCHAEFER Flue and Boiler Brushes of SILVER BRITE Rustproof Wire

SCHAEFER'S special alloy "Silver Brite" rustproof spring steel wire has been developed for longer wear, more effective cleaning. It offers extra value, extra satisfaction in any brush.

SCHAEFER
Rectangular Flue Brushes

No. S-415—2"x4"x4½"
No. S-416—3"x5"x4½"



SCHAEFER
Boiler Brushes

No. S-393—1¾"x4"x5⅛"
No. S-394—2½"x6"x6⅛"
No. S-395—3½"x6"x6⅛"

SCHAEFER
Boiler Brushes

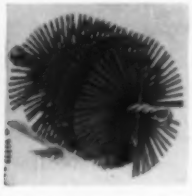
No. S-390—1⅝"x4"x4½"
No. S-391—2½"x6"x4½"
No. S-392—3½"x6⅝"x 4½"

SCHAEFER
Boiler Brushes

No. S-399—2"x4"x6"
No. S-400—2½"x4½"x6"
No. S-401—3"x5"x6"

Single and Double Spiral Flue Brushes

No. S-432—Single Spiral —1" to 4" dia.
No. S-433—Double Spiral —1" to 4" dia.
No. S-434—For small Flues, ½" to 1" dia.

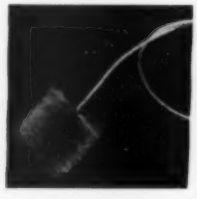


SCHAEFER Round Flue Brushes of Single Spiral, Flat Steel Wire

No. S-430—1" to 4" dia.

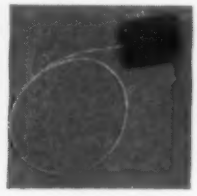
SCHAEFER Rectangular Flue Brushes of Flat Steel Wire—Spiral

No. S-420—2"x3¼"x4"
No. S-425—2¾"x6¾"x7"



SCHAEFER Furnace Brushes of Silver Brite Rustproof Steel

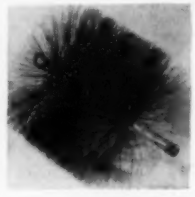
No. S-442—3", 4", 4½", 5" with 5 ft. handle.



SCHAEFER
Fibre Furnace Brushes

Selected Bassine fibre, flexible wire stem, 4", 5", 6" dia., 48" and 60" handle.

No. S-444-445



SCHAEFER Chimney Cleaning Brushes

No. 66—6", 7", 8", 10" and 12" dia. round style of Black Tempered Brush Wire.
No. 666—6", 7", 8", 10" and 12" dia. oblong style of Flat Tempered Steel Wire.

SCHAEFER
Wire Wheel Brushes

Solid Center Type of crimped steel wire.
No. 276—6" dia. x 1⅝" face.
No. 278—8" dia. x 1⅝" face.
No. 280—10" dia. x 2" face.

SCHAEFER
Handy Wire Brush

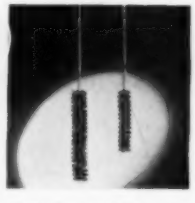
No. 816 — For roughing, soldering etc., 6" long, tempered steel wire trimmed 1½".

Tin Handle Acid or Dope Brushes

Selected grade bristles in tin ferrule. Width, ⅝", ⅞", ⅝".

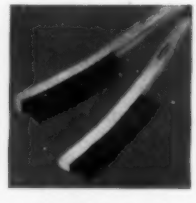
T. W. Flat Acid Brushes

Tinners soldering brush, horsehair filling, 1¼" width, 7½" overall. Twisted wire handle.



Radiator or Condenser Tube Brushes

Twisted in wire handle, selected hair or bristle. Wide range of sizes.
No. 10—⅝" dia. x 2" brush x 6½" overall.
No. 11—½" dia. x 3" brush x 8½" overall.

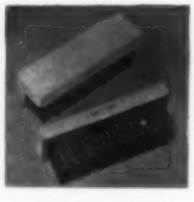


SCHAEFER Curved Handle Wire Brushes

No. 810 — Oil tempered steel wire, trimmed 1¼", hardwood block, 14" long. Brush 6", 2, 3 or 4 rows.

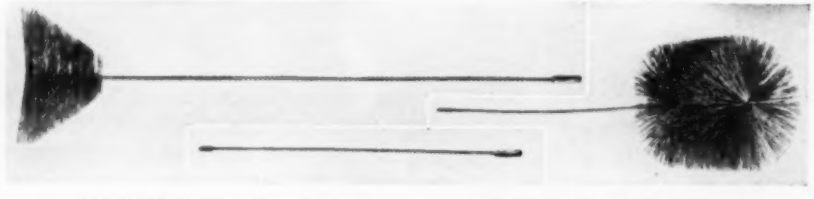
SCHAEFER Shoe Handle Wire Brushes

No. 812 — Oil tempered rustproof wire, 5" brush, 2, 3, 4 rows. Trim 1¼", overall 10".



SCHAEFER Straight Back Wire Brushes

No. 800-11—Oil tempered steel wire. Hardwood block, 7½" x 2¼". Wire trim, 1¾", 6 x 10 rows.



SCHAEFER Vacuum Cleaner Brushes

No. 1005—Bassine Fibre Brush, 10½" dia. tapered to 3" dia. x 6 ft. long—48" handle with threaded nipple at end.
No. 1000—Bassine Fibre Brush, 10½" dia. brush x 10" long. Handle 39" with threaded nipple at end.

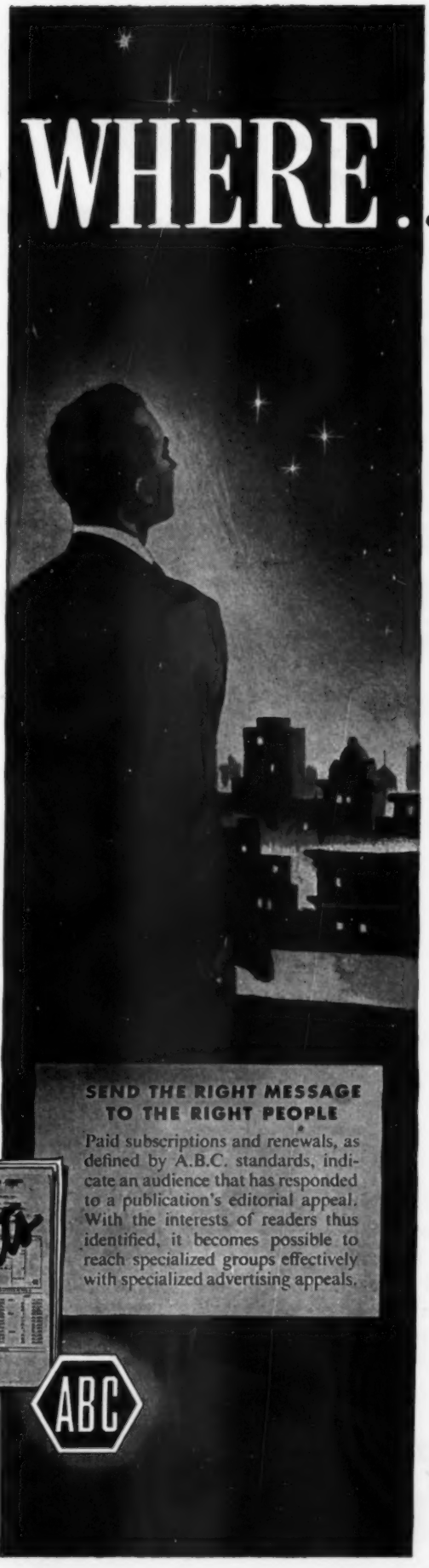
Wire Flue Brush and Extension Handles

4 ft. Handles with Nipple and Coupling.
5 ft. Handles with Nipple and Coupling.
6 ft. Handles with Nipple and Coupling.

Write for SCHAEFER Catalog of flue and furnace brushes, or for information on any special brushes for specific requirements.

SCHAEFER BRUSH MFG. CO.
117 W. Walker Street Milwaukee 4, Wisconsin

Oh! WHERE *... is my wandering ad tonight?*


SEND THE RIGHT MESSAGE TO THE RIGHT PEOPLE
Paid subscriptions and renewals, as defined by A.B.C. standards, indicate an audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.
A B C Reports
ABC

THERE are two ways to buy advertising space. One is the guesswork-opinion method. The caption above is the mournful song of an advertiser who is still selecting media the way it was done before World War I, when there were no standards for the circulations of published media and when there was no accepted and approved method of auditing circulations. In those days, advertisers O.K.'d their proofs and sent out their advertising with a prayer that some of their sales messages would find their way to market.

The other way to buy space is the factual, know-what-you-get-for-your-money method. Today advertisers can start their investments on a basis of facts by selecting media with the help of the information in the reports issued by the AUDIT BUREAU OF CIRCULATIONS. This cooperative and nonprofit association of 3300 advertisers, advertising agencies and publishers, organized in 1914, has established standards that make it possible to evaluate the circulations of published media. The A.B.C. maintains a large staff of experienced and specially trained circulation auditors who make annual audits of the circulations of publisher members. A.B.C. reports give the facts thus obtained.

Here are some of the audited facts about business papers that A.B.C. reports tell the advertiser:

—how much paid circulation;
—how much unpaid;
—an occupational or business breakdown of subscribers;
—where they are located;
—how much subscribers pay;
—whether or not premiums are used;
—how many subscribers are in arrears;
—what percentage of subscriptions are renewed.

Those who buy advertising on the basis of this factual information, as given in A.B.C. reports, do not have to speculate about the distribution of their sales messages. They KNOW where and to whom their advertising goes. That is why this business paper is a member of the AUDIT BUREAU OF CIRCULATIONS. Ask for a copy of our A.B.C. report and then study it.

AMERICAN ARTISAN

A.B.C. REPORTS—FACTS AS THE BASIC MEASURE OF ADVERTISING VALUE

U.S. ROLLING AGAIN AT TOP SPEED!

YOU CAN GET THESE EXCELLENT U. S. REGISTERS IMMEDIATELY FROM THE BEST — LARGEST — REGISTER PLANT IN THE INDUSTRY!

There is no register—anywhere—that can compare with the *beauty and versatility* of the No. 256. It allows you to run your stack-head air-flow *from any direction*— sides, top, bottom, or back— without obstruction. The combination of multiple valves and adjustable grille-bars lets you direct the air-flow *in any direction* for best heating results.

This is the *Best-constructed single valve register in the industry*— bar none! A real Quality Product for those customers who demand that price be pared to the bone without sacrificing good appearance. Grille-bars are adjustable and hide register interior. Compare with imitators.

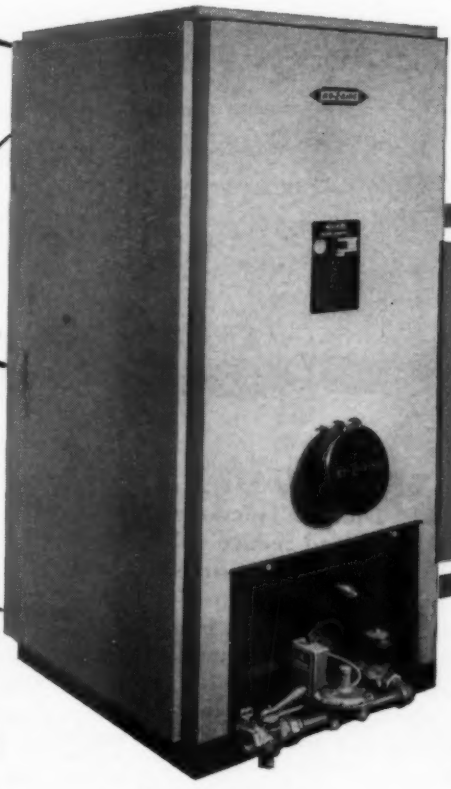
Yes — U. S. is rolling again at Top-speed—ready to give you immediate shipment on any register or grille in the line . . . ready to give you complete satisfaction backed by 50 years of experience. No longer do you need to accept anything but the highest quality construction as standardized by U. S. modern methods. Order today for immediate rush shipment. Send for the new U. S. Handy Pocket Catalog, No. 50.

UNITED STATES REGISTER COMPANY
BATTLE CREEK, MICHIGAN
MINNEAPOLIS • KANSAS CITY • ALBANY
SOLD BY LEADING JOBBERS FROM COAST TO COAST

HERE'S YOUR *LOW COST* GAS-FIRED GRAVITY UNIT

TOP-NOTCH PERFORMANCE

ROCK-BOTTOM PRICE



the **NEW**

KO-Z-AIRE "70"

GRAVITY GAS HEATING UNIT

AGA APPROVED

Puts you right into the *COMPETITIVE PICTURE*

EXTRA PROFITS!

BLOWER EASILY INSTALLED

For those home-owners who prefer it, now or later, a blower unit may be installed with the "70" for an extra-profit sale.

ECONOMICAL! EFFICIENT!

PRICED TO SELL! The rock-bottom price tag you can put on this new KO-Z-AIRE "70" gives you a terrific advantage over other gas heating units . . . either on single jobs or in the multiple-housing field!

BUILT TO LAST! Just 26½" square and 54½" high, and rugged from top to bottom. This KO-Z-AIRE "70" (70,000 Btu Input) comes completely assembled, ready for quick, easy installation. It's really built for business . . . *profitable* business for you!

ANOTHER J&B PRODUCT

MAIL THIS COUPON TODAY!

KO-Z-AIRE®

JONES & BROWN, Inc.

439 Sixth Avenue · Pittsburgh 19, Pa.

Jones & Brown, Inc.,
439 Sixth Avenue,
Pittsburgh 19, Pa.

Rush me the complete story on the new, rock-bottom-priced KO-Z-AIRE 70-GG.

Name_____

Street_____

City_____ State_____

AA

No Air Conditioning System Is Better Than Its Air Distribution

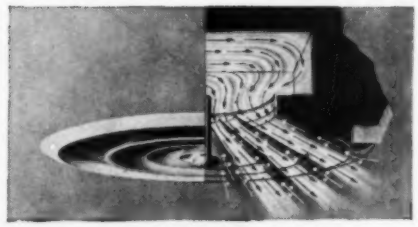
LEADING ARCHITECTS AND ENGINEERS *agree:*

"One of the most vital factors to the success of a forced air heating, ventilating, cooling or air conditioning system is correct air distribution. Even when an air conditioning system delivers the required quantity of conditioned air, it may still do an incomplete job. For poor air will cause unsatisfactory room conditions."

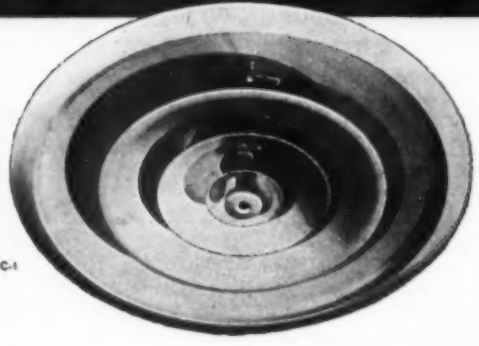
THERE'S NO NEED TO GAMBLE with improper air distribution in your heating, cooling or air conditioning system. When you specify patented Anemostat Air Diffusers, you never have to worry about such trouble-breeders as drafts and stale air pockets. Because of their *exclusive* aspiration principle, Anemostat Air Diffusers *instantly equalize* temperature and humidity, distribute conditioned air to *every* part of the room with *complete freedom from drafts.*

These benefits cannot be over-estimated. In stores, Anemostats help assure true comfort, prevent colds due to drafts and build steady patronage. In offices and plants, Anemostat Air Diffusers increase employee efficiency and reduce absenteeism. In theatres, Anemostats help bring patrons back by providing maximum comfort in every seat in the house. Today, more than 1,000,000 Anemostats are insuring *better, more profitable* working conditions throughout industry and business.

So whether you are revamping an existing system or designing a new one, be sure to specify Anemostat Air Diffusers. They are your guarantee of perfect performance of the "business end" of any heating, ventilating or air conditioning system.



Here, graphically presented, is the aspiration principle that makes the Anemostat Air Diffuser superior to all others. Due to its patented design, the Anemostat distributes air of any duct velocity in a multiplicity of planes traveling in all directions. Simultaneously, the unit creates a series of counter-currents which siphon into the device room air up to 35% of the supply air depending on the type of unit. This room air is mixed with the supply air *within* the Anemostat before the air mixture is discharged into the enclosure.



TYPE C-1

AC 1216

ANEMOSTAT.

DRAFTLESS *Aspirating* **AIR DIFFUSERS**

ANEMOSTAT CORPORATION OF AMERICA

10 EAST 39th STREET, NEW YORK 16, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

"No Air Conditioning System is Better Than Its Air Distribution"

MOST HEATING SYSTEMS END UP BY

WARMING THE AIR

WHY NOT BEGIN WITH IT?

DRAVO *Counterflo* HEATERS

Dravo *Counterflo* Heaters provide a highly efficient heating method for open area structures. This method is efficient because it heats the air right where it's to be used and without employing water or steam as intermediaries.

No "conversion" losses with Dravo *Counterflo* Heaters on the job. The heater warms the air, and the positive, directed circulation floods the working zone with warmth. Burns oil or gas as fuel—can be readily converted from one to the other. Low fuel cost—80 to 85% efficiency. Low installed cost—users report 50 to 66% less investment than in standard wet type heating systems. Immediate delivery, quick, easy installation, no delays due to pipe shortages. Thousands of successful installations. Write for Bulletin CD-523-3

DRAVO
CORPORATION
DRAVO BUILDING, PITTSBURGH 22, PA.

Dravo also manufactures the *DRAVO CRANE CAB COOLER* for air conditioning hot-metal crane cabs.

PITTSBURGH • CLEVELAND • PHILADELPHIA • DETROIT • NEW YORK • CHICAGO • ATLANTA • BOSTON

Sales Representatives in Principal Cities. Mfd. and Sold in Canada by Marine Industries, Ltd., Sorel, Quebec.

DRAVO

PHONE STATE 6916

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING · WARM AIR HEATING · SHEET METAL CONTRACTING

KEENEY PUBLISHING CO.
6 NORTH MICHIGAN AVE.
C H I C A G O 2

31 October 1949

**TO BUYERS OF ADVERTISING
IN THE WARM AIR HEATING-SHEET METAL FIELD**

Many of you, in view of announcements of advertising rate increases and changes in circulation policies made by other publications in the warm air heating and sheet metal field, have asked us what AMERICAN ARTISAN intends to do.

1. We are not going to increase advertising rates at this time.

2. There will be no change in our all-paid circulation policy.

We intend to maintain our present policies for as long as they continue to prove that they best serve our field. We intend to hold our rates at their present levels for as long as they adequately cover the costs of our services.

AMERICAN ARTISAN has the largest paid circulation of any magazine in the field. It has demonstrated that, with superior editorial material and a sound circulation program, it is possible to build and hold a paid circulation among the key volume outlets of the industry. More circulation, in numbers, would add little to the purchasing and specifying power which is now represented in its reader audience.

Its editorial and circulation accomplishments have been the basis for securing, year in and year out, the largest volume of manufacturer advertising of any magazine in the field. This leadership, which is by a wide margin, has also been built on complete marketing services to its advertisers and their agencies and on consistent rate policies.

In its dealing with advertisers, AMERICAN ARTISAN's policy is to make no discrimination as to prices, positions, or terms of payment for the same amount and kind of space used under the same conditions and within the same period of time. It is not one rate to one and a different rate to another. An AMERICAN ARTISAN advertiser can know there is no better price or "deal" than the one he is getting.

If such results as leadership in paid circulation and leadership in advertising volume can be taken as evidence of the soundness and worth of

PHONE STATE 6916

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING · WARM AIR HEATING · SHEET METAL CONTRACTING

KEENEY PUBLISHING CO.
6 NORTH MICHIGAN AVE.
CHICAGO 2

31 October 1949

the publishing methods we pursue, we feel that they should be continued. We believe that they should weigh heavily with buyers in their considerations of media values. The paper which achieves such position is there because it best serves the reader and the advertiser.

AMERICAN ARTISAN has proved that if a magazine is worthwhile to readers, the readers will pay for it. If other publishers, however, find it to their business advantage not to put their papers to this test or, having done so, abandon it as too difficult, that is their business, not ours. It is significant, we believe, that no other class of printed media, except shopping newspapers and some directories, finds it necessary to give away its circulation in order to sell advertising. General magazines do not. Newspapers do not.

As for a combination paid and free circulation, we find that the publication which adopts this method of distribution does so when it can not compete with one which has enjoyed leadership as a result of many years of service to the industry, superior editorial material and a more efficient circulation job. It adds sufficient free distribution to its paid circulation to match or exceed its competitor in numbers. This is a policy which tries to interpret numbers on a mailing list as the thing the advertiser wants, needs and is willing to pay more money for.

Disregarded is the matter of whether it is ethical or a fair trade practice to charge one subscriber and give the magazine free to another. Disregarded is the question of the value that is created by such additional free circulation among firms which have for years had the opportunity to get the paper on a paid subscription basis. Disregarded is what will happen to the paid subscribers when they learn, as they eventually will, that they are being discriminated against.

Our only intent, in this letter, is to affirm AMERICAN ARTISAN's policy and to raise for questioning in this field the values to the advertiser in both this policy and other policies of publishing. The buyer is the final judge.

Very truly yours
AMERICAN ARTISAN

F P Keeney

Frank P. Keeney
Publisher

comfort
convenience
fuel savings

NIGHT and DAY

with

Magic Dial Clock Thermostat

MAGIC DIAL CLOCK THERMOSTAT
Series 125 (available also in standard model... Series 153). One of a complete line of Perfex Twin Contact Controls for every heating application.

exclusive 3 way advantages

1 KEEPS TEMPERATURE RIGHT DAY AND NIGHT

Automatically lowers night temperature for comfort and fuel saving. Automatically brings temperature up to comfortable daytime warmth in the morning. In addition—it's a handsome, accurate timepiece on the wall!

2 "TAILORS" THE OPERATION OF THE HEATING SYSTEM TO EACH INDIVIDUAL HOME

With a simple fingertip adjustment the *"on"* or operating period of the heating system is *balanced* to the individual home and the particular heating plant. No plugs to change —factory pre-set thermostats lack this advantage.

3 KEEPS THE HEATING SYSTEM "IN STEP" WITH ANY WEATHER

Regardless of the outside weather "Magic Dial" keeps the *heat* in tune with the *heat loss.* Lengthens "on" periods in cold weather, shortens them when it's mild. It's automatic . . . and the *Night and Day* changeover is automatic, too.

easy to install! . . . easy to adjust!

Two wire circuit makes installation fast and simple . . . Accurately calibrated . . . Service free performance of dependable twin contact switch is unsurpassed . . . User can make fingertip adjustments *in the home.*

For all details of sales and service advantages of this and all Perfex Twin Contact Controls—write *today* for name of Perfex service distributor nearest you.

Dealers Who Want the Best Ask For

PERFEX
TWIN CONTACT CONTROLS

PERFEX CORPORATION, MILWAUKEE, WISCONSIN • *In Canada, Perfex Controls Ltd., Toronto 1, Canada*

A COMPLETE LINE OF TWIN CONTACT CONTROLS FOR ALL FUELS . . . FOR ALL TYPES OF HEATING

The brand most in demand...

Galvanized steel sheets bearing the familiar U·S·S Trade-mark enjoy an acceptance that's second to none. The small metal-worker, as well as the large fabricator, likes them because of their superior workability; the shop manager, the jobber and the retailer prefer them because the good-looking products made from this famous brand are easier to sell . . . give lasting customer satisfaction; and your customers demand them because they recognize the widely advertised U·S·S Label as a symbol of the finest quality . . . and as an assurance of durability.

When you need sheets, remember that for fabricating quality . . . for selling value, U·S·S Steel Sheets are as fine as money can buy.

CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST

USS

U·S·S STEEL SHEETS

9-978

UNITED STATES STEEL

3 Top Quality RYBOLT HEATING UNITS TO MEET EVERY FUEL REQUIREMENT

FOR GAS

IT'S RYBOLT SERIES RG 58

Cast Iron Gas-Fired Winter Air Conditioner

A completely automatic winter air conditioner, thoroughly modern in every detail of advanced heating engineering and design. Three sizes: 70,000 BTU, 105,000 BTU and 140,000 BTU.

MEMBER NATIONAL WARM AIR HEATING AND AIR CONDITIONING ASSOCIATION — INDOOR COMFORT

FOR COAL

IT'S RYBOLT SERIES 153

Cast Iron, Coal-Fired Winter Air Conditioner

Designed for all fuels, easily convertible. Also can be adapted for stoker firing. Embodies many important new refinements and advanced features. Single full height cabinet of smooth furniture steel, handsomely finished in two-tone gray baked enamel.

FOR OIL

IT'S RYBOLT OIL-FIRED, *Winter Air Conditioner*

For the home owner who prefers oil as a fuel, this unit offers dependable completely automatic heating comfort and convenience. Pressure atomizing type oil burner, quiet and economical. Heating unit of heavy steel plate with large heating surface. Beautiful two-tone gray baked enamel casing.

Attractive illustrated folders giving full details of the complete Rybolt line are available on request. Write for them.

THE RYBOLT HEATER COMPANY

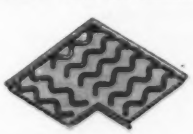
615 MILLER STREET ★ ASHLAND, OHIO

Specify Anaconda Through-Wall Flashing

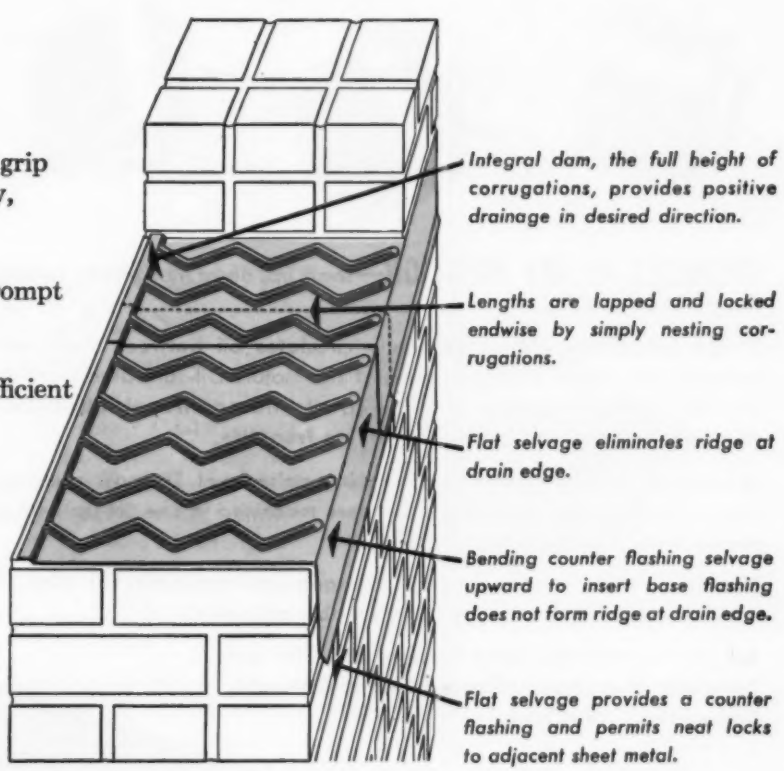
the flashing that drains itself dry

better because . . .

1. ANACONDA herringbone corrugations grip mortar firmly, strongly—permanently, above and below.
2. ANACONDA design assures proper—prompt —complete drainage.
3. ANACONDA flat selvage makes neat, efficient installation easier—faster.
4. Integral one-piece corner flashings are available.



Standard outside corner flashing unit. Dam on outside, drains in.


Integral dam, the full height of corrugations, provides positive drainage in desired direction.
Lengths are lapped and locked endwise by simply nesting corrugations.
Flat selvage eliminates ridge at drain edge.
Bending counter flashing selvage upward to insert base flashing does not form ridge at drain edge.
Flat selvage provides a counter flashing and permits neat locks to adjacent sheet metal.

For complete information on ANACONDA Through-Wall Flashing, let us send you booklet C-28. Just address The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. 4905A

For sure protection ANACONDA THROUGH-WALL FLASHING

ALL-ANGLE OPERATION

HERE'S A NEW MOTOR FOR YOUR FANS

OPERATES IN ANY POSITION—shaft up, down, horizontal, or any intermediate position.

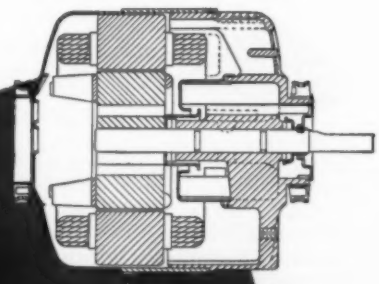
A new lubrication system constantly circulates oil between shaft and bearing, regardless of the position of the motor. Oil-saturated packing continuously feeds bearing with filtered oil—**no additional lubrication required throughout its long, service-free life.**

Quiet and light weight—extremely low noise level. Die-cast aluminum housing reduces weight. Bearing surfaces machined in one set-up—gives permanently true alignment.

Versatile—variety of mounting arrangements available; as well as variable-speed operation by using suitable controller.

Ask your nearest G-E sales representative for details.
Apparatus Department, General Electric Company, Schenectady, New York.

UNIT-BEARING MOTOR



GENERAL ELECTRIC

AIRTEMP DEALERSHIPS AVAILABLE!

Investigate today–

Sell the famous Chrysler Airtemp Heating and Air Conditioning Products–Big Market–Strong Demand–Good Profits

● You'll find Chrysler Airtemp products a fine line to sell—well known and highly regarded—nationally advertised and in good demand. They are designed and built to high standards for dependable performance and long life.

Here are *quality* products priced to meet the needs of home, business and industry. Products to sell 12 months a year assure you profit opportunities in every season. And you'll find we back our dealers with close cooperation in advertising, promotion and field engineering service.

Investigate this opportunity while it still exists. Write today—without obligation—for full details. Or mail the coupon.

NATIONALLY-ADVERTISED PRODUCTS FOR YEAR-'ROUND SALES

(you can handle heating or air conditioning separately if desired)

Gas and Oil-Fired Furnaces and Winter Air Conditioners • Gas and Oil-Fired Boilers • Oil, Gas and Electric Water Heaters • Oil Burners • Coal Furnaces • Convertible Winter Air Conditioners for gas, oil or coal • Year Around Air Conditioning Units (Heats and Cools) • Anthracite and Bituminous Domestic Stokers • Blower Units for Furnaces • Stoker-Fired Water Heaters • Room Air Conditioners • Packaged Air Conditioners • Commercial Refrigeration • Condensing Units • Central Systems Cooling Equipment • Marine Refrigeration • Water Cooling Towers.

Chrysler Airtemp

"PACKAGED" AIR CONDITIONING
CENTRAL STATION SYSTEMS
HEATING AND COMMERCIAL REFRIGERATION
AIRTEMP DIVISION OF CHRYSLER CORPORATION
DAYTON 1, OHIO
In Canada: Therm-O-Rite Products, Ltd., Toronto

Mail Today for Details

AIRTEMP DIVISION, CHRYSLER CORPORATION
DAYTON 1, OHIO
Send immediately full details about the Chrysler Airtemp dealership arrangements, without obligation.

Name_____

Company_____

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City_____ Zone_____ State_____

A.A. 7-49

Humidity

—a vital ingredient in heating

Skuttle

HUMIDIFIERS

SERIES 600
FOR OIL OR GAS-FIRED FORCED WARM AIR

The answer to the humidity problem where plenum temperature is low. Skuttle Vapoglas Plates are being used by approximately 80% of the heating industry. 56 sq. in. per Vapoglas Plate exposed to heated blower air provides needed evaporation area for humidity. Single size Series 600 holes 5 to 20 plates—for jobs up to 180,000 BTU. Single model fits any bonnet. Self-flushing—self-cleaning.

SERIES 500
FOR COAL—STOKER OR
HAND-FIRED WARM AIR

High plenum temperature in coal-fired plants provides plenty of evaporation from large pan. Plates not necessary where temperatures are above boiling. Skuttle safety type valve assures trouble-free, automatic water feed.

FUEL ECONOMY— LONG LIFE

Skuttle

WINDMASTER DRAFT CONTROL

Scientifically designed to do a better job of draft control. Test chart shows a flat curve, assuring even, effective control—better operation at all draft values. Square housing and patented angle mounting provide larger effective area—more uniform opening.

Simple, sturdy construction enables you to offer your customer a better regulator for less money—at more profit to you.

Your jobber stocks Humidifiers and Draft Controls.

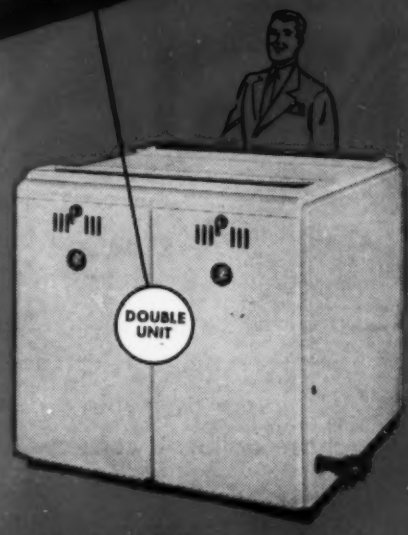
THE Skuttle
MANUFACTURING COMPANY
4099 BEAUFAIT • DETROIT 7, MICH.
WRITE FOR DETAILS

Job sizes—no problem with the NEW RICHMOND TWIN UNITS!

With the addition of three new "twin-units," Richmond's complete line of cast-iron Gas Winter Air Conditioners is able to fill most any warm air job. Large estates or compact cottages—medium size homes or commercial installations—there is a unit in the Richmond line to fill your need.

Check these capacities—they range from 66,000 to 280,000 BTU input. Models GHA 22-23-24 are paired up in a handsome "whiter-white" steel jacket with one set of controls—the GHA 1, 2, 3 and 4 are single units. All jackets are only 42" high—giving plenty of head and duct room. For jobs where floor space is at a premium, vertical units (same ratings as GHA 1, 2, 3 and 4) are available.

UNIT NO.	AGA RATINGS	
	INPUT BTU PER HR.	OUTPUT BTU PER HR.
GHA-1	66,000	52,800
GHA-2	90,000	72,000
GHA-3	115,000	92,000
GHA-4	140,000	112,000
GHA-22	180,000	144,000
GHA-23	230,000	184,000
GHA-24	280,000	224,000

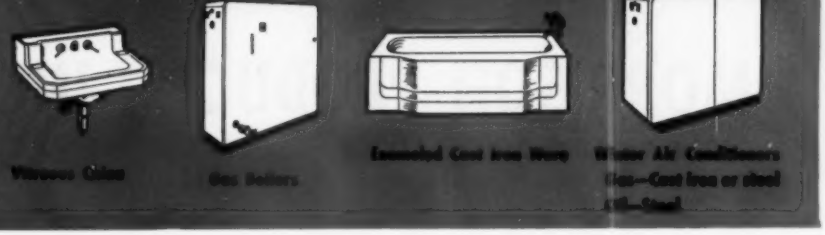


A unit designed with the TRADE in mind!

RICHMOND
RR
PLUMBING & HEATING

RICHMOND

RICHMOND RADIATOR CO.—AFFILIATE OF REYNOLDS METALS CO.



Vitreous China | Gas Boilers | Enameled Cast Iron Heaters | Winter Air Conditioners Gas—Cast Iron or Steel Oil—Steel

See your wholesaler or MAIL COUPON TODAY AA-11

Richmond Radiator Company
19 East 47th Street, New York 17, N. Y.

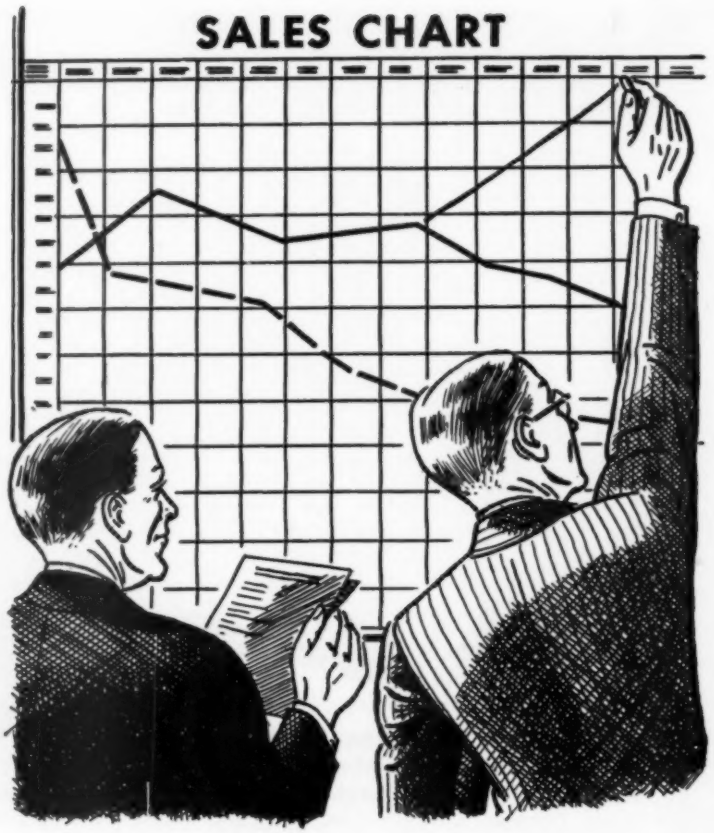
Please send me complete information and illustrated folder on the new twin unit Richmond Gas Winter Air Conditioners. No obligations, of course.

Name.....

Company.....

Address.....

A Message in all Frankness to TOP MANAGEMENT IN HEATING, VENTILATING, AND AIR CONDITIONING



Consider Your Advantage

in Taking Care of Your Own Plant Overhead, and in Maintaining Your Own Trained Craftsmen by Manufacturing Your Own Blower Assemblies. You Buy Only Airstream Blower Wheels, and drives, and bearings. Your Blower engineering is Complete ...and Gratis.

Do you know that there is opportunity to keep for your own plant up to ½ of your Blower dollar—to buy from others only Morrison Airstream Blower Wheels, and the bearings, and the drives. This permits you to take care of your own overhead by cutting down your purchase dollar. It conserves working capital. It's a procedure that reduces inventory. It conserves working capital by permitting you to **manufacture against a firm schedule** rather than tie up working capital in an inventory purchased against a projected sales schedule.

Morrison furnishes Airstream Blower Wheels plus the Personalized Engineering, Research and Development cooperation for the design of a Blower to meet your requirements. Morrison cooperates too, in giving accurate data on Blower performance through your own furnace.

In building your own Blower Assemblies, you meet today's problems of harder to obtain sales due to market readjustments. You utilize your own plant capacity—and hold together your own organization. You also incorporate into your Blowers a quality identical with the quality of your furnaces.

MORRISON Airstream

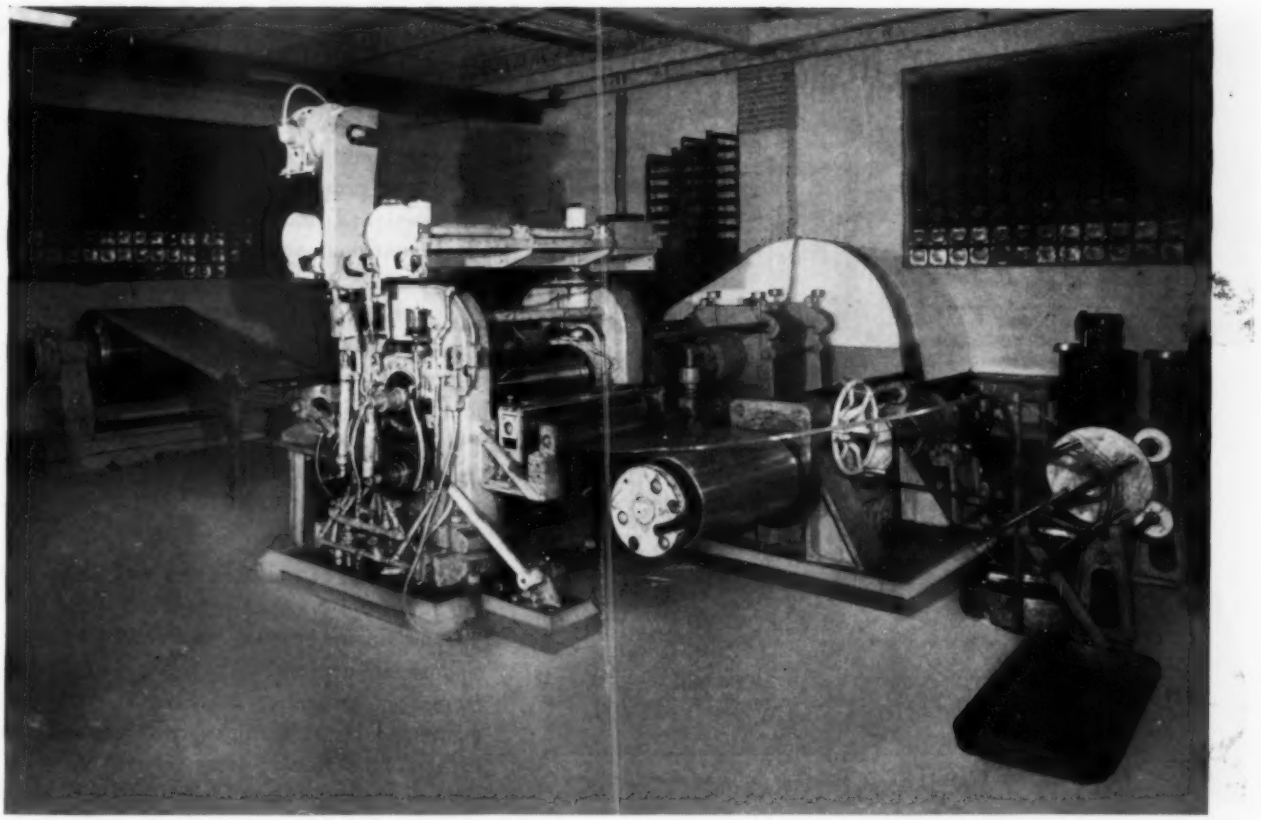
PATENTED

MORRISON PRODUCTS, INC.

16816 WATERLOO ROAD • CLEVELAND 10, OHIO

CHAR-GALE

Adds Another SERVICE FOR ITS CUSTOMERS!



The New Reduction Rolling Mill at Char-Gale's Minneapolis Plant #1

Still another Char-Gale service coming your way! Shown above is the new Reduction Rolling Mill just installed in Char-Gale's Minneapolis Plant #1. The purpose—faster, better production methods on aluminum coils and sheets. The result—better than ever service to Char-Gale customers . . . men who know from experience that to buy from Char-Gale is to buy the best.

The installation of this large capacity mill is in keeping with Char-Gale's strict policy to give consistently superior and faster service to its customers in every way possible. It is this sort of planning—efficiently producing a complete line—offering fast, direct truckload shipments with discount—that has made our customers the most satisfied in the field.

Registers • Ducts • Humidifiers • Galvanized and Aluminum Fittings • Pipe and Elbows • Galvanized and Aluminum Sheets and Coils

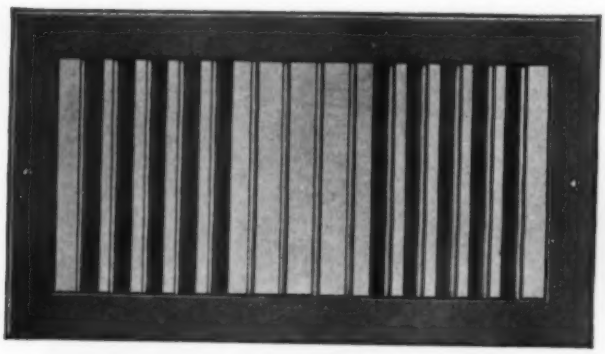
made by

CHAR-GALE MANUFACTURING CO.

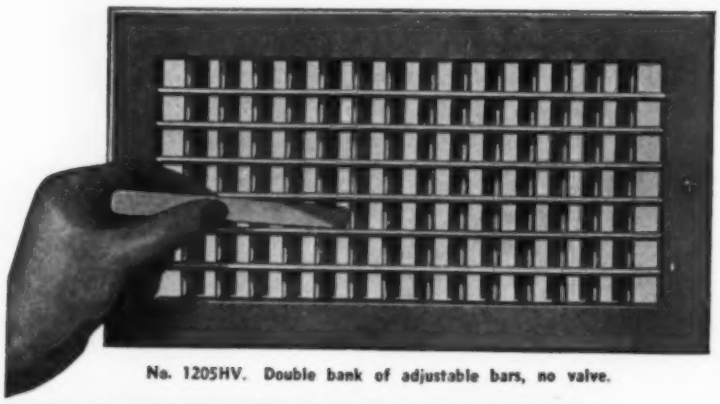
MINNEAPOLIS **OMAHA**

The NEW AUER de luxe "Streamliner"

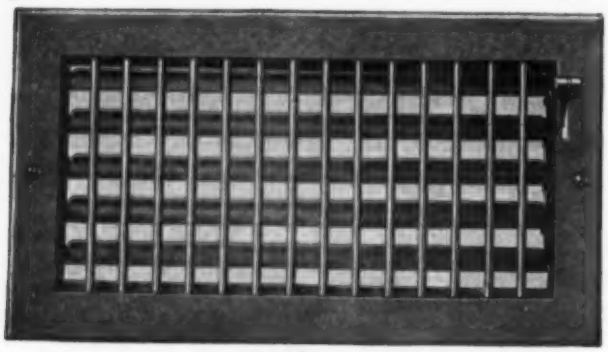
MULTIPLE DEFLECTION Air Conditioning Registers & Grilles



No. 1005V. Single bank of adjustable bars, no valve.



No. 1205HV. Double bank of adjustable bars, no valve.



No. 1005V-HML. Single bank of adjustable bars, with multi-louvre valve.

For High Velocity Outlets

Streamliner wall registers and grilles, for high grade air conditioning systems, are designed and built with the fine craftsmanship you expect from Auer. They provide *better* diffusion for high velocity outlets. The Series includes models with single bank of adjustable bars (vertical or horizontal), also with double bank of adjustable bars (vertical in front and horizontal in back, or the reverse), also all above four types with the addition of horizontal multi-louvre valves in the rear, controlled by lever on face of register.

The design of the bars and method of mounting them are *original* with Auer. Bars are hollow moulded, beveled, perfectly formed, and smooth in contour. They are pivoted in the frame on special split sleeves. This improved expansion insert furnishes just enough tension to hold bars firmly where set, yet permits sufficient free movement for adjustment to the desired angle with one simple tool. Bars may be set at any angle and in any grouping. Blades of multi-louvre valve are pivoted on rivets to prevent vibration. All Streamliner registers are equipped with gaskets.

We offer these superior registers at moderate prices, and with pride in their high standard of beauty and excellence. You too will be proud to install them on your very finest work. Write for descriptive folder S-49.

● Auer's full line of registers and returns for air conditioning or gravity systems is shown in Auer Register Book, sent on request. For perforated grilles, ask for Catalog "G".

THE AUER REGISTER CO., 3608 PAYNE AVENUE, CLEVELAND 14, OHIO

Auer REGISTERS
& GRILLES for AIR CONDITIONING & GRAVITY

News Round-Up

U. S. STEEL OFFER

ON THE DAY BEFORE THE STEEL STRIKE began Benjamin F. Fairless, president of United States Steel Corporation issued a statement defining the offer that his company had made to Philip Murray and his United Steel Workers. Mr. Fairless said:

"Under United States Steel's proposal for a contributory insurance program to be forthwith negotiated and put into effect, United States Steel would pay about $5.70 a month for each participating employee. The cost to a single employee would be about $2.00 a month and about $3.00 a month for an employee obtaining insurance for his dependents.

"These insurance contributions by employees would not reduce their present take-home pay, nor would they be in any sense a wage cut, as Mr. Murray has charged. U. S. Steel employees on the average are now paying more under present contributory insurance and employee welfare plans than they would be asked to contribute under the company's proposal, which would provide superior benefits to those now available."

In the matter of pensions the company offered to enter into a study of pension plans, to be concluded by March 1, 1950. With the study completed an effort would then be made to negotiate a satisfactory pension plan to become effective on April 30, 1950.

D. W. NORRIS DIES

D. W. NORRIS, Pasadena, Calif., president of The Lennox Furnace Company died suddenly in Columbus, Ohio, on Oct. 5. He was buried in Forest Lawn Memorial Park in Glendale, Calif., on Oct. 10. Mr. Norris was 73 years old.

Born in Chicago, Ill., in 1876 Mr. Norris moved with his parents to Grinnell, Iowa, where he was graduated from Grinnell college in 1896. He developed an interest in newspaper work while in college and in 1899 purchased the *Marshalltown Times Republican* of which he was the editor continuously for 50 years.

Mr. Norris purchased a controlling interest in The Lennox Furnace Company at Marshalltown, Iowa, in 1904 when its annual output was less than 600 furnaces. He not only expanded the Marshalltown plant through the years but in the interim acquired or built factories at Syracuse, N. Y., Columbus, Ohio, Decatur, Ga., Fort Worth, Texas, Pasadena, Calif., and Salt Lake City, Utah. Under his direction the company has become the largest manufacturer of warm air heating systems in the world and in addition to its factories includes in its program several conveniently located iron foundries as well as a machine tool and die division at Columbus, Ohio. Mr. Norris was also the principal owner of The Armstrong Furnace Company with factories at Columbus, Ohio, and Des Moines, Iowa, and of The Lima Register Company at Lima, Ohio.

JULY FURNACE SHIPMENTS

SHIPMENTS OF WARM AIR FURNACES in the month of July amounted to 48,552 units, a decline from the 55,857 units shipped in June, 1949. The July figure was also below the 57,292 units that were shipped in July of

News Round-Up

1948. These figures have been released by the Bureau of the Census of the U. S. Department of Commerce.

A break-down according to types of fuel shows that 13,253 coal-fired furnaces were shipped in July as compared with 14,425 in June and 29,435 units in July, 1948. Oil fired units totaled 15,240 units in July as against 16,829 in June and 12,881 in July, 1948. Gas fired furnaces shipped amounted to 20,059 in July, compared with 24,076 in June and 14,796 units in July, 1948.

Forced air furnaces made up 31,021 units of the July shipments, with gravity units accounting for the remaining 17,531. These figures compared with 29,107 forced air units and 28,185 gravity units in July of last year.

HOUSING STARTS

HOMEBUILDING SET ANOTHER RECORD IN SEPTEMBER, with 100,000 new permanent nonfarm dwelling units started, according to preliminary estimates of the U. S. Labor Department's Bureau of Labor Statistics. The increase was 2,000 above August 1949, and 17,800, or 22 per cent, over September 1948. The large September volume reflects an August-September increase in building permits issued for residential construction in urban areas.

Homebuilding activity has continued steadily upward since the beginning of the year, with July, August, and September at record levels. Preliminary Bureau estimates show a 743,000-unit total for the first three quarters of 1949, surpassing last year's January-September total by 1,600 units.

Final estimates for the first 6 months of 1949 indicate that rental housing (units in 2-or-more family structures) accounted for almost a fourth of all new dwelling units started during this period. For the same months in 1948, rental housing was about a fifth of total new housing starts.

Nonfarm housing in rural places comprised 44 per cent of total new housing started during the first 6 months of both 1948 and 1949.

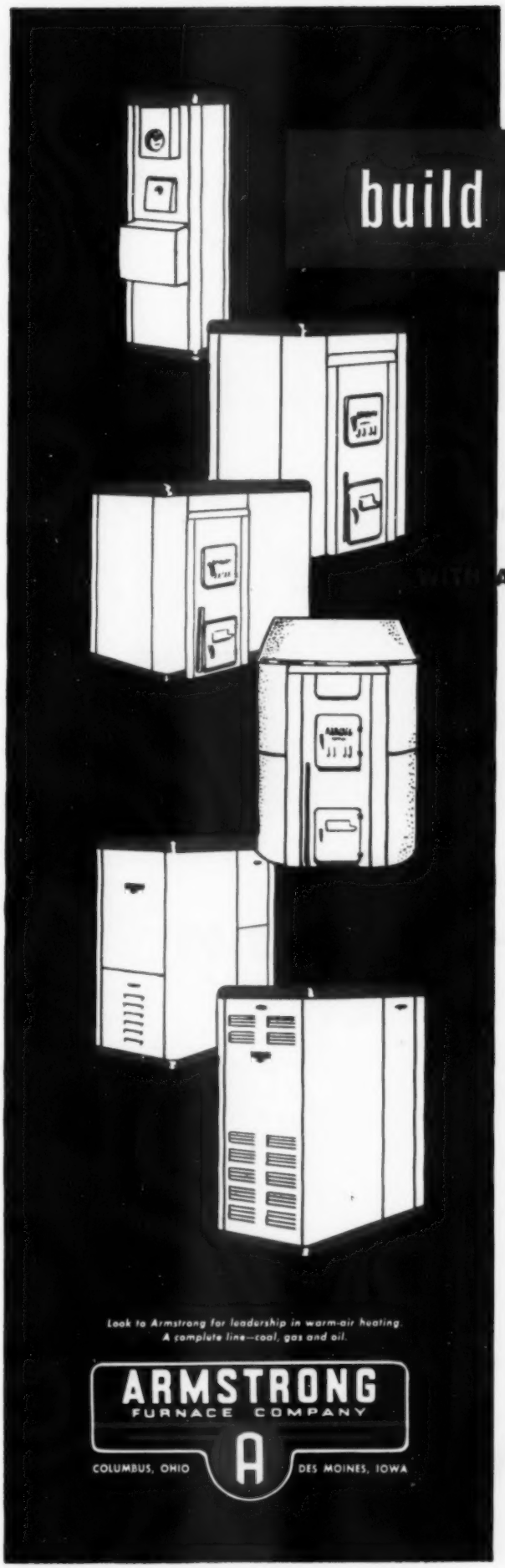
GUY VOORHEES APPOINTED

GUY A. VOORHEES, application engineering director of the National Warm Air Heating and Air Conditioning Association, has recently been assigned the additional duty of technical secretary.

"In this capacity," states Atlee Wise, president of the association, "Mr. Voorhees will coordinate the activities and investigations of the various committees of the association.

Mr. Voorhees, who recently received an honorary degree in mechanical engineering from Michigan State College, will continue to instruct the *Indoor Comfort* Conferences sponsored by the association. He is currently preparing the instructional material for the new two-day conferences being scheduled for 1950.

A member of the American Society of Heating and Ventilating Engineers, American Society of Mechanical Engineers, and Indiana Society of Professional Engineers; Mr. Voorhees is known throughout the industry.



Sales Profits

WITH ARMSTRONG'S COMPLETE FURNACE LINE

A UNIT FOR EVERY NEED OR PREFERENCE

Armstrong offers 54 models and sizes of warm air heating equipment, from 57,000 to 700,000 BTU. There are units for coal, units for gas, units for oil—hi-boys and basement models — forced-air and gravity. It's a complete furnace line, with a unit for every warm air heating need or preference.

PROTECTED PROFIT MARGIN

Armstrong furnaces carry a good margin of profit, and Armstrong protects your profit by providing you with equipment which has been designed, engineered and manufactured to give completely satisfactory service. Few service calls — pleased customers — higher profits.

MERCHANDISING ASSISTANCE

To help you build your sales and profits, Armstrong offers you a complete merchandising program, including publicity stories, prepared newspaper advertisements, handbills and doorhangers, direct mail material, and complete advice and prepared scripts for radio, telephone solicitation and house-to-house canvassing. It's complete in every detail. It will help you sell heating equipment.

SELECTIVE DISTRIBUTION

Armstrong heating equipment is distributed to the installing dealer through authorized Armstrong jobbers, who have been carefully selected for their ability to provide proper facilities for effective service to dealers. Send in the coupon for additional information about an Armstrong connection in your territory.

____ I am a wholesaler. Send me more information on Armstrong selective distribution.

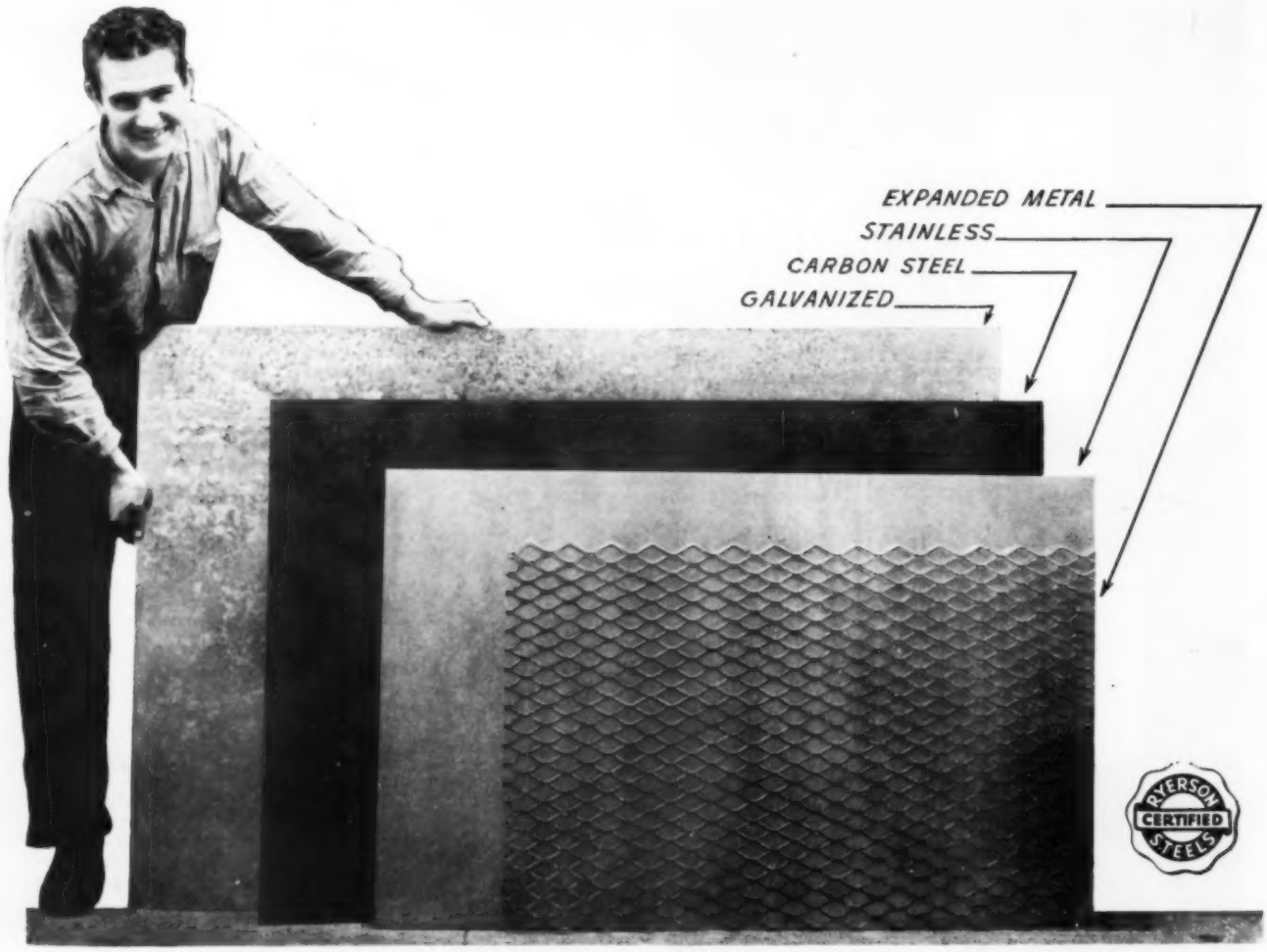
____ I am a retail dealer. Send me the name of the Armstrong distributor in my vicinity.

FIRM NAME_____

STREET ADDRESS_____

CITY AND STATE_____

SIGNED_____



All Kinds of Sheet Steel Quickly — from Ryerson

Call Ryerson when you need sheet steel promptly. Despite the steel strike, you can still get quick shipment of many kinds from a nearby Ryerson plant. Though galvanized sheet stocks are limited, other carbon and stainless sheets are still on hand in a fairly wide range of types and gauges. Ryex expanded metal is also available—and we have large stocks of most every gauge and pattern size.

Profit-building expanded metal is adaptable to a wide variety of sheet metal shop work. And Ryex expanded metal is a high quality product that is easy to fabricate without special equipment—easy to handle because all sharp edges have positively been removed.

When sheet metal jobs call for the long life and enduring beauty of stainless steel, Ryerson service on Allegheny stainless can often save time and money. In addition to quick shipment of time-tested Allegheny stainless, Ryerson offers the services of experienced stainless specialists to help you on problems of selection and fabrication for profitable stainless applications such as roof drainage jobs, flue lining and all kinds of duct work.

So call us for stainless, expanded metal — and every other steel requirement. We can probably ship the steel you need. We will certainly make every effort to serve you.

OTHER PRODUCTS

BARS—Carbon & Alloy, hot rolled & cold finished	TUBING—Seamless & welded	PLATES—Sheared & U.M., Floor Plate
STRUCTURALS—Angles, beams, channels, etc.	STAINLESS — Allegheny bars, tubes, plates	MACHINERY & TOOLS—For metal working

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

AMERICAN ARTISAN

So Much for So Many

PEOPLE HAVE BEEN DOING A LOT OF THINKING these days about business conditions and our way of life. All of us are wondering what the future holds in the way of employment opportunities, earnings, prices, and many other things having a bearing on our ability to earn a good living and enjoy a happy life.

In seeking answers to some of the questions of the day, we are prompted to ask: What are the things that really keep our economy going—keep us in jobs and provide the goods and services we need? What is the broad purpose of business? What are the mainsprings of business?

The thinking person will reach the conclusion that the purpose of business is to satisfy the needs and wants of people. Does our present economic system satisfy these needs—can it do better? How does our system compare with others? These are proper questions.

The most convincing answers are found in the facts of history. To fully appreciate the development of industry and its ability to supply the many needs of an expanding population, a glance at the record is helpful. Such an examination leads to a startling realization.

In the past 175 years of industrial development, greater advancement has been made in satisfying the needs and wants of our people than had been made in 6,000 years before!

In all the 6,000 years before, the civilizations of those times had not been able to adequately feed, clothe and house the masses of the people. Periodic famine and mass starvation were experienced in many countries, as is tragically true today in some parts of the world. The United States and Canada are two of the few countries that have never suffered mass starvation.

It is interesting to note that the United States and Canada comprise 12.7 per cent of the world's land area and that the people make up, in these two countries, only 6.7 per cent of the world's population. Yet these people consume 79 per cent of the world's automobiles and 62.8 per cent of the telephones. These high ratios are true also of thousands of other items which go to make up our high standard of living.

Why is this true? Why are more goods produced than in any other countries? Is it because we have more resources? Do we work harder and longer? Do we have more muscle power? Are we a superior race? You will find that the answer to these questions is an obvious "No." It boils down to the simple fact that we make more efficient use of our energy.

This is possible only under a free form of government. As individuals, we are more free to develop ideas, exert energy, create, and invent.

Even more important is the fact that with freedom of opportunity we also have the knowledge that we are rewarded for our efforts in proportion to the contribution we make.

In a material way, we are able to make more efficient use of our energy because we have more tools with which to work. Tools of every kind, from the simple pliers and screw driver to the greatest examples of industrial development.

It was not always this way, of course. Before the invention of the steel plow, for example, the production of food was possible only on a very small scale. The soil was tilled in a very crude and time consuming manner. With the invention of the steel plow, by John Deere, vast areas were opened to agricultural development. Other inventions followed, and today we have the greatest food producing machines in the world. At the same time, agricultural employment has greatly increased.

By producing more, we have been able to provide ourselves with more of the good things in life. The key link in the successful economic chain has been productivity. By producing more goods, unit costs have come down, which has permitted lower prices. This, in turn, has brought products within the range of more and more people. Increased sales volume has made it possible to acquire still more tools for further increased production which in turn has provided additional employment for more and more individuals. Inevitably, each time this cycle has taken place it has meant increased benefits to greater and greater numbers of people.

We recognize this as a matter of historical record. That is why we must zealously guard the system which has provided so much for so many. Perhaps we do not yet know how to avoid booms and busts and unemployment, but the indisputable fact is that our system has provided more good things for the common man than any other system known.

A Constant Stream of New Customers

DAVID MARKSTEIN
New Orleans, Louisiana

Last month techniques for holding and bringing back old customers were discussed. In order to maintain a regular growth the business must continually attract new customers and some effective promotional ideas are given here.

IF you want to see your sales volume, and your profits, show a steadily increasing growth year after year, you need a constant stream of new customers, not to replace old customers (who, like old friends, are the best), but to provide new income dollars.

If the automobile manufacturers were still selling only to the small circle of horseless carriage owners of 1900, one of the United States' biggest industries would be only an infant today. By attracting a constant stream of new customers, the car manufacturers have made their industry one of the world's big, basic industries.

The same rule holds true for every store, service establishment, and business of any description that has grown to be great from a small start. The secret of constantly increasing profits is a constantly increasing circle of customers.

Many *Indoor Comfort* dealers have become big business men because they took steps to draw new customers all the time. It isn't as easy as selling only repeat customers and accidental buyers. But, if you like to see a higher net profit figure on your profit and loss statement than you saw last year, you must go out and sell these new customers. They won't come to you.

Analyze Your Business

As a first step, sit down and ask yourself some questions. Don't do it in an offhand manner. Look for the right answers, even if it takes some puzzling to get them. When you have the answers, you have the foundation upon which you can build an effective program for bringing a constant stream of new customers and new dollars through your doors. What uses has each product and each service you sell?

Why do people come to you instead of your competitors? What do you have to offer that they haven't?

What seasonal services could sell in off-seasons if presented in the right way?

How far does your market extend geographically? Would it be profitable to sell customers who are located farther away?

What added services can you render profitably? (That word "profitably" is the key to this question. If it doesn't make a profit, there's no use doing it; indeed, you'd be losing money on each new customer an extra service brought in, if it were an unprofitable operation.) Are you advertising enough? It takes continuing, steady advertising to insure a continuing growth.

Could you sell profitably on the telephone? Why not install a special phone service and use it to go out after new customers?

Would prizes and premiums bring in enough new customers to make them profitable?

Sales Problems

What can be done to improve the methods of the salesmen in order to make each one a walking institutional advertisement for the company?

Are your men second-selling and doing all the suggestion selling possible? Often, there is an untapped mine of extra profits right in your regular group of customers.

It's well worth the time to study the geographical extent of your market in order to discover how far away most of your customers live. One heating contractor in the South was surprised to find out from such a study that most of his customers came from an area extending for a radius of only a few miles.

Looking at these figures, he wondered. His firm could as easily and as profitably do work at twice the distance away. Why, then, shouldn't he sell more customers?

So, when he next prepared direct mail advertising he saw that it was sent to the customers residing in an area represented by a ring drawn on the city map. The ring comprised all the area in which he could

work profitably. Result? He soon had calls from areas he had formerly hardly touched, and a new source of profits.

But he didn't stop there. Again, he pondered. If he brought more equipment, would it be able to pay for itself if he were to widen the circle of customers once more? The answer, he decided, was yes, so he invested in the equipment and a series of newspaper advertisements that pointed out how he was prepared to do work anywhere in three counties. Again, he brought in a stream of orders from new customers, whose purchases represented another totally new source of profits.

The number and the extent of your services has a lot to do with adding to your list of customers. By and large, people go to the firm they like, and generally, their liking has little to do with cut-rate pricing. More often, it is the services and, many times, the personality of the owner.

When you wonder whether more and wider services could build up your volume, remember to consider whether they would be *profitable* services. It may cost you $1000 to do something, but if doing it brings in enough new business to pile up $2000 in profits at the end of the year, you are well ahead. Many times, however, services can cost more than they make in building additional sales volume.

Service Must Profit

Services rendered by a heating and sheet metal company to its customers are an effective friendship and sales builder. But unless they make profits as well, they are hurting rather than helping you. It's necessary to judge accurately whether a new service will be a money-maker or a money-loser.

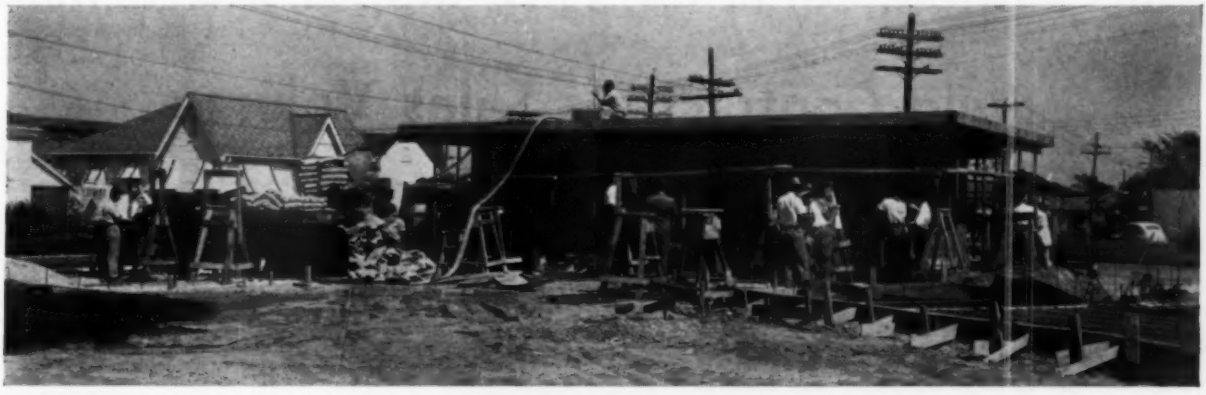
The obvious and, nine times out of ten, the most effective way to pull in a stream of new customers is to increase your advertising. There are few *Indoor Comfort* dealers who advertise to the extent that their sales will permit. Speaking generally (and individual conditions can make a difference), the average contractor can afford to spend around three per cent of gross income for advertising.

The man who allots this advertising investment, and uses it wisely to advertise the things that people want to buy, is the one whose business shows a steady, continuing growth. Usually, he can total many new customers added to his circle of business friends at the end of every year.

Neglecting to advertise is one of the most expensive ways to do business.

And advertising to the full extent that your budget allows is a sure-fire way to gain plenty of new customers.

Telephone selling, too, is a much neglected device that has infinite possibilities for increasing the customer list. To be sure, most heating contractors take orders over the telephone. But there is a difference between taking orders and *selling*.



Wherever there is new construction there is a market for *Indoor Comfort*.

Telephone Selling

One *Indoor Comfort* dealer installed an extra telephone with an unlisted number so customers wouldn't be annoyed when they called and found the line busy. Then he hired a girl to use this sales telephone. A special furnace cleaning and resetting offer was developed for her to sell.

Promptly at opening time each day, she began calling prospects. To the customers who answered these calls, the girl gave a cheery, "Good morning," and then announced the money-saving furnace cleaning offer.

"It positively amazed me," says this contractor, "how much our business grew after we started selling, not simply order-taking, over the telephone. Why, that one girl opened the door to hundreds of sales, and today I'm doing business with a three girl telephone set-up. The number of new customers secured this way, whom we had never before sold is startling."

Prize contests and premiums are another sure-fire way to get more people interested in buying. The list of contest and premium possibilities is endless: The contests can be anything from an impressive, big money, affair to a weekly award of five dollars for the

best jingle. The premium ideas, too, couldn't be counted in a book.

A smart premium was worked out by one Atlantic Coast business man, who offered a special "one for twenty" premium. With every twenty dollar sale he gave a credit slip that was good for another dollar in trade.

He advertised the offer widely, and, in the six months he continued it, he brought in scores of new customers who had previously never purchased from him.

"The beauty of a promotion like this," he points out, "is that it needn't be carried on forever. You'll draw many new buyers with it, and the chances are that once those new customers have caught the habit of coming to you, they will continue to do so. Habit is a strong thing."

Educating the contact man to do such an institutional selling job on the new customers that they will want to come back, is another way to insure a constant stream of new prospects, who become old customers.

All of the new volume possibilities in the current list of regular customers is seldom tapped by the ordinary kind of selling. Suggestion selling and second selling can uncover a well of new profits.

Radio Announcements, Newspaper Advertising Build Contractor's Sales Volume

Partial view of Comb's furnace display

By
HARRY L. SPOONER

A planned promotional program aimed at keeping his company's name before the public has paid off in ever-increasing sales volume. The effectiveness of advertising is easily proven here.

A WELL-BALANCED promotional program which is extensive enough to include radio spot broadcasts has attracted all the work that can be handled by the Combs Heating and Sheet Metal Company, Pekin, Illinois. The organization is small, consisting of E. L. Combs, owner, Mrs. Combs, who acts as secretary and handles the office work, and an apprentice who assists the owner in shop and installation work.

Window and floor displays at the front of the office play an important part in the overall program of promotion. There is one large window which extends from the ceiling almost to the floor and a ledge is provided at the bottom of this window for a display of small items and accessories. This border display does not obstruct the larger display behind it, which consists of furnaces, stokers, air conditioning units and plumbing fixtures. These units are well-arranged and can easily be observed by the pedestrians who pass the shop. Court Street on which the firm is located is a main artery and many prospects see the display each day.

Radio Spot Announcements

Perhaps the widest coverage of any of the phases of promotion used by this company is provided by the radio spot announcements which are made on WWXL, Peoria, twice a week. Each of these announcements features one particular part of the Combs' business and the address of the shop as well as the telephone number is given. Many sales have been attributed directly to these broadcasts.

Newspaper advertising is used consistently and effectively. A classified ad appears in the daily paper each

day featuring furnaces, stokers and blowers. Display ads are placed once a week. In addition to this steady newspaper advertising, fraternal papers are frequently given display ads.

Full use is also made of the classified telephone directory, which is one of the most satisfactory producers of immediate advertising results. The business is listed in bold-face type under several classifications and an ad is placed under the furnace classification.

The giveaway is another form of promotion which provides a steady reminder that the Combs company is prepared to handle heating and sheet metal work.

E. L. Combs welds a sheet metal collar on a vent pipe atop a Quaker Oats plant. Portable welding equipment can be seen in the background.

NOW IS THE TIME

- **TO INSPECT YOUR FURNACE AND MAKE NECESSARY REPAIRS**
- **REPLACE OLD GUTTERS AND DOWN SPOUTINGS**

Mueller Climatrol Oil, Gas and Coal Fired Air Conditioning Furnaces

xxth Century Gravity and Forced Air Furnaces.

Consolidated Stokers (with a 10 year guarantee).

Air Conditioning Units.

Sheet Metal Work.

Automatic and Electric Hot Water Heaters.

Eljer Plumbing Fixtures and Supplies.

Combs Heating and Sheet Metal

Phone 2198 **209 Court St.**

A typical Combs' ad

Calendars, book matches and thermometers are the most popular items in this category and the persons who receive these small gifts appreciate them, keep them and send their friends in to the shop. In this way the number of people familiar with the firm increases steadily with little actual sales effort. Mr. Combs and his helper are both war veterans and their contacts with other veterans also bring in business.

As mentioned above, the location of the Combs shop is a good one on a main thoroughfare and many potential customers walk past each day. The building is 20 by 96 ft in area and is fully equipped. Front 30 ft of the structure is set off for display, sales room and office. Heating, air conditioning and sheet metal work account for most of the sales but plumbing fixtures are also sold and installed.

Equipment Is Important

The shop is well-equipped because it is important to the owner that all work be done as quickly and efficiently as possible, in order to keep labor costs at a minimum. Machinery includes a brake, squaring shear, slip roll former, portable arc welder, heavy duty punch, bar folder, and a throatless shear. All necessary hand tools are available and ample work benches are provided. Ductwork for the heating jobs installed by this company is always made of galvanized steel. Mr. Combs is an expert welder and frequently is required to do outside jobs of welding, using the portable equipment.

Financing by FHA

Since the firm is not large, facilities for handling time payments are not extensive. All over the counter sales are cash, and all shop work has a limit of 30 days for payment. Installations of furnaces, stokers, and air conditioning units are handled on FHA loans, which now require no down payment.

There is not a long history behind this firm, since it was founded in 1947 after Mr. Combs returned from the armed forces. His father had operated a sheet metal shop in another Illinois town for many years so tradition was followed when the son opened his own shop. Here is a man who feels a great pride in his independence and the fact that his success or failure rest on his own shoulders. He has developed his present business through a well-balanced program of promotion and regards his customers as friends and does everything he can to satisfy their requirements.

Simplified Bookkeeping System

For Heating & Sheet Metal Contractors

PART FIVE

ARTHUR ROBERTS
Pompton Lakes, New Jersey

Striking a trial balance of each account every month is one method of determining accuracy of the bookkeeping system. If the account is not in balance, it is possible to check and find the error immediately before it grows from month to month and causes serious difficulty.

AFTER the journal is summarized at the end of the month, the next step is to transfer the debits and credits to the ledger. Obviously, if they balance in the summary they should balance in the ledger. But errors occur. That is why a bookkeeper takes a trial balance of the ledger accounts every month. Debit balances must equal credit balances to the penny otherwise he checks back. This is important. Sometimes a difference of only 10 cents may become a substantial variation after a check-back, because errors offset each other. When the debit balances equal the credit balances, the ledger is said to be in balance.

The journal shows the following summaries:

Receipts

Debits		Credits	
Cash received	$2,455.00	Accounts receivable (control)	$ 685.00
Discount allowed	10.00	Merchandise sales	692.98
Accounts receivable (control)	535.00	Repairs and service sales	54.50
		Installation sales	475.00
		Other receipts	1,085.00
		Sales tax	7.52
Total debits	$3,000.00	Total credits	$3,000.00

Disbursements

Debits		Credits	
Labor	$ 134.10	Cash for bank	$ 666.10
Materials	220.00	Discount earned	5.00
Truck expense	52.00	Accounts payable (control)	230.00
Office expense	28.00	Petty cash fund	22.72
Other disbursements	242.00	Internal transfers	2,270.00
Accounts payable (control)	270.00		
Petty cash fund	25.00		
Internal transfers	2,222.72		
Total debits	$3,193.82	Total credits	$3,193.82

These figures are transferred to the ledger. Balances of the preceding month are added to the current month's figures. If the ledger was in balance the preceding month and the current month's summaries from the journal balance, then obviously the cumulative totals on the ledger accounts will balance.

Take the cash account, for example. If the preceding month's balnace on this account was $2,000, the ledger account would look like this:

A

Cash Account

1949 Debit

April balance	$2,000.00
May—from journal	2,455.00
	$4,455.00

1949 Credit

May—from journal	$ 666.10
Balance	$3,788.90

This balance should check with the bank balance if deposits were made daily to the penny for the money received and if all disbursements were made by check. It isn't necessary to rule off accounts each month. Merely bring down penciled totals and pencil in the balance. Rule off the profit and loss statement accounts once a year when they are written off to profit and loss, then begin the new year with an open account. Asset and liability accounts are never ruled off unless the accounts are closed. Some bookkeepers make exception here on the cash account, the control on accounts receivable or accounts payable if there are many listings over a period of time. They rule them off, bring down the balance and start again, taking out the old sheets and filing them in a discontinued ledger binder. It makes for tidier bookwork and faster recording.

Take the accounts payable control. If there was $600 due suppliers the preceding month, the account in the ledger would look like this:

B

Accounts Payable (control)

Debit

May—from journal	$270

Credit

April balance	$600
May—from journal	230
	$830
Balance	$560

This account now shows that $230 was purchased from suppliers in May, which added to the April balance makes $830. You paid suppliers $250 in cash and returned $20 in materials, $270 in all. Deducting $270 from $830 you find the current balance due suppliers—$560. The bills in file should also total $560. If individual accounts are carried with suppliers in the ledger, the total should be $560. If not, check for the discrepancy. The accounts payable and accounts receivable ledgers or sections of the general ledger are auxiliary records. They should always be in balance with the controls.

If the balance on accounts receivable the preceding month was $1,000, this control account in the ledger would look like this:

C

Accounts Receivable

Debit

April balance	$1,000.00
May—from journal	585.00
	$1,585.00

Credit

May—from journal	$ 695.00
May bad debt	50.00
	$ 745.00
Balance	840.00

This account indicates sales of $585 in credit accounts in May, collections of $695 and a bad debt of $50, and that the balance is now $840. The detail on accounts recivable showing the accounts due from individual credit customers should show a grand total of $840. If not, check for the difference.

The straight expense accounts offer no problem—labor, other disbursements as detailed in journal, truck expenses, office expense and discount allowed. Merely post the debit summaries to the preceding balances. Likewise, with the sales accounts. The expense accounts are debits, the sales accounts are credits.

Other receipts and internal transfers are posted to the ledger accounts individually. The journal summary shown above includes $1,085 in other receipts, which are credit postings.

Borrowed from bank	$1,000.00
Interest received	40.00
J. Salvage Company—scrap	20.00
Rent for garage	25.00
Total other receipts	$1,085.00

Money borrowed from bank is a liability and credited to a loans payable account. Interest received is credited to interest, the $20 for scrap may be credited to inventory or profit or loss. Rent for garage is credited to miscellaneous income or may be credited to the rent account, if you rent the entire premises from someone else. Sales tax is credited to this account. It is a liability. The total on this account shows what you owe the tax authorities. The offsetting debit for all these credits is, of course, the cash account. You received the cash—$2,455.00—see A, debited it to this account, and to offset this figure, you credit accounts of equal value. The foregoing credits account for only $1,092.52. The credits for the difference between this figure and the $2,455.00 debit to cash are made up by the credit to the sales accounts for cash sales and the amount credited for discount received, which may be credited to an account of this name or under a general account called Miscellaneous Income.

Some transactions occur so infrequently that it simplifies the bookwork to use a miscellaneous account for such entries, keeping them all under one account. You'll have to use your judgment here. Some businessmen keep a separate record of cash sales. In this system we combine cash and credit sales. Here too, it's up to the reader. If you separate cash and credit sales you must set up separate columns for them in the

(Please turn to page 144)

Atlee Wise

National Warm Air Heating & Air Conditioning Assn.'s 36th Convention

Topics of importance to everyone in the warm air heating industry have been scheduled for the December meeting of the association. Anyone who can possibly attend should do so.

INFORMATION OF FAR-REACHING IMPORTANCE to the warm air heating industry will be presented at the 36th Annual Convention of the National Warm Air Heating and Air Conditioning Association at Hotel Cleveland, Cleveland, Ohio, on December 14th and 15th. This is the statement made by Atlee Wise, president of the Association; John E. Peterson, editor, AMERICAN ARTISAN and H. C. Gurney, Surface Combustion Corporation, members of the association's Program Committee.

Leading off the two-day convention will be Atlee Wise, president of Wise Furnace Co., Akron, Ohio and president of the Association. Mr. Wise will call the convention to order with his opening address. Following President Wise will be a talk by Charles E. Price, general manager of AMERICAN ARTISAN, entitled "Distribution Trends in Warm Air Heating." According to Mr. Price the subject matter presented will cover a comparison of the dealer's situation in 1949 as compared with that in 1947. Slides will be used to illustrate his talk.

"Your Association's Publicity Program" will be discussed by M. I. Levy, president, Viking Air Conditioning Association and chairman of the Publicity and Merchandising Committee. Mr. Levy will point out the accomplishments made during the past six-month consumer and industry publicity campaign and outline the 1950 publicity program.

Howard Hartman, assistant treasurer, L. J. Mueller Furnace Co., who has made an extensive study on credits and the various Federal Housing Administration regulations, will discuss Title 1 Loans and the other parts of the governmental aids to home owners and builders. The title of Mr. Hartman's talk will be "Credits and The Federal Housing Administration."

The nomination and election of officers and members to the board of trustees will complete the morning schedule on December 14th.

Opening the afternoon session will be the Honorable Robert A. Taft, U. S. Senator from Ohio. One of the best-informed persons on today's political scene, Senator Taft's talk will touch on current developments and information of interest both to the warm air heating industry and to labor with facts and figures to substantiate his statements.

Elizabeth Gordon, editor of *House Beautiful*, will take part in the afternoon session also. For further details on her subject see THE EDITOR'S NOTEBOOK.

The Thursday session of the convention will consist of reports of the research activities conducted in cooperation with the University of Illinois during the early part of the 1949-50 heating season. Norman A. Buckley, special research assistant in Mechanical Engineering, University of Illinois, will report on the balance of winter air conditioning systems when total air quantity at furnaces is varied. Morris E. Childs, special research assistant in Mechanical Engineering, University of Illinois, will deliver a preliminary report on investigation in the new Research Residence No. 3.

Plans for the new two-day 1950 *Indoor Comfort* Conferences will be outlined by Guy A. Voorhees, application engineering director of the association. These conferences, currently being scheduled throughout the country, are planned to give the student an opportunity to meet the growing trend for warm air heating low-cost basementless homes constructed on a concrete slab and for larger non-residential heating installations.

Committee Reports

Activity reports by chairmen of the various association committees will include reports by F. L. Meyer, president, Meyer Furnace Co., Peoria, Illinois, chairman of the Research Advisory Committee, W. D. Redrup, Majestic Company, Huntington, Indiana, chairman of the Installations Codes Committee and Chairman of Application Engineering Advisory Committee, C. W. Nessell, Minneapolis-Honeywell Regulator Company, Minneapolis, Minn., Chairman, Field Investigation Committee and Dean Lorin G. Miller, Professor, Michigan State College, East Lansing, Michigan, Chairman of Technical Education Committee.

For fun and relaxation, a banquet is planned for Wednesday noon, and a cocktail party is being arranged for the evening of December 14th.

There is no registration charge for members of the association. Registration fee for non-members is as follows: Manufacturer representatives $15.00, distributor representatives $10.00 and dealer representatives $5.00.

Preconvention meetings of the various association committees will take place prior to the opening of the convention. These meetings of the Research Advisory Committee, Installation Codes Committee, Application Engineering Advisory Committee, Technical Education Committee and the Publicity and Merchandising Committee will be held starting on December 12th and 13th.

A topic of universal interest at the present time is retirement income. Few people are able to calculate their income from Social Security. Here's how!

H. Armstrong Roberts photo

How To Figure Old Age Benefits

WHAT will my benefits amount to under the Federal Old Age and Survivor Insurance program?

This all-important question and many others relating to government retirement benefits arise in the minds of workers who are nearing age 65, the time when their payroll deductions marked OAB will begin to pay off in the form of monthly retirement income.

Can you as an employer answer these questions satisfactorily? Employer-employee relations in the warm air heating and sheet metal industry are close, and many employees look to their employers for suggestions, guidance, and information on financial matters. Just in case you are not too clear on all the phases of the retirement plan, let us quickly review the keypoints, such as insured status, basis of benefits, job coverage, formula for figuring retirement income, and restrictions affecting a worker's eligibility.

There are two kinds of insured status: fully insured and currently insured. In order to be fully insured, a worker must have been paid $50 or more, in jobs covered by social security, in at least half the number of calendar quarters as there are between January 1, 1937 (the start of the plan) and the quarter in which he becomes 65 or dies. The calendar quarter referred to is any three month period beginning in January, April, July, or October. Once a worker has 40 quarters of coverage he is said to be fully and permantly insured. This means that even if he should take a job not covered by social security after securing his 40 quarters of coverage, his benefits will not be decreased or lost.

To be currently insured, a status that carries with it only survivor benefits for a worker's family, an employee must have been paid not less than $50 in each of 6 or more quarters during the period consisting of the 12 calendar quarters immediately preceding his death and the calendar quarter in which he died.

This will serve to clarify social security terminology

but for the purpose of figuring a worker's retirement income, you need be concerned only with the fully insured worker.

Basis of Benefits

Benefits to be received after retirement depend on the average monthly wage which a worker has received in jobs covered by social security since the inception of the plan on January 1, 1937. A statement of earnings and deductions credited to each worker's social security account number may be obtained at any time by requesting it from the nearest social security field office. Once this has been obtained, you are ready to help your employee figure his retirement income.

The first step is to add all wages received by the worker in covered employment up to $3000 a year (the maximum amount from which social security deductions are made) since January 1, 1937, and divide this total by the number of months from January 1937 up to the calendar quarter in which the worker will reach age 65. The figure thus obtained will be the average monthly wage and the basis for figuring benefits to be received.

In adding a worker's earnings to arrive at the average monthly wage, it is important to remember that wages received in jobs not covered by social security do not count toward retirement benefits and must not be included in total wages. Jobs on which social security does not apply include jobs in agriculture; domestic service in private homes; Federal, state, or local government service; and work in religious, charitable, or other non-profit organizations.

Formula for Figuring Benefits

Once the average monthly wage of a worker has been determined, as explained above, the following formula may be used to estimate retirement income payable to him at age 65.

(1) Take 40 per cent of the first $50 of his average monthly wage.

(2) Subtract $50 from the total average monthly wage. Remember that $250 is the maximum figure for this average.

(3) Take 10 per cent of the remainder thus obtained.

(4) Add the two figures obtained in lines 1 and 3 above.

(5) Take 1 per cent of this total for each year in which $200 or more was earned in covered employment.

(6) Add the amounts obtained in lines 4 and 5 and the sum of these two is the primary insurance benefit.

This may sound a little complicated in the abstract, so let's see how the formula works out for two hypothetical cases.

First, the case of Joseph Smith, who was 52 years old at the start of the plan and who will reach retirement age in 1950. Assuming that his average monthly wage has worked out to $150, we can figure his retirement income as follows by use of the formula:

(1) 40% of first $50	$20.00
(2) Subtracting $50 from $150 (average monthly wage, balance is $100	
(3) $100 x .1	.10.00
(4) Adding lines 1 and 3 gives us basic benefit	$30.00
(5) $30 x .01 = .30	
.30 x 13 yrs (worked under plan)	3.90
(6) Adding amounts in lines 4 and 5 gives us primary benefit, or monthly retirement income	$33.90

For our second example, we will work out the same formula for Harold Jones, who was 37 years old in 1937, the start of the plan, and who will reach retirement age in 1965. Assuming an average monthly wage of $250 (maximum which can be used), we can figure his retirement income in the same manner.

(1) 40% of first $50	$20.00
(2) Subtracting $50 from $250 = $200	
(3) $200 x .1	20.00
(4) Adding gives us basic benefit	$40.00
(5) $40 x .01 = .40	
.40 x 28 yrs (from 1937 to 1965)	11.20
(6) Adding amounts in lines 4 and 5, we find primary benefit, or monthly retirement income	$51.20

Under the present plan, a retired worker's wife, on reaching age 65, will receive benefit payments equal to 50 per cent of her husband's monthly income. In the case of Mrs. Jones, benefits payable to her would be $25.60 monthly, ½ of the $51.20 obtained in line 6 of the example. Their combined monthly retirement income, when both are 65, would then amount to $76.80.

Restrictions Affecting Benefits

If I earn any money after I have retired at age 65 will my benefits be stopped?

This question too should be clarified so that an employee will be able to plan for the retirement years. Money which a retired worker earns in self-employment or on any job not covered by social security will not affect payment of monthly benefits. However, if he accepts a job in covered employment in which he earns more than $14.99 in any one month, his retirement pay will be suspended for that period. If his wife is receiving benefits which have accrued to the worker's social security account, her payments will also stop for that period.

There is another important phase of social security, aside from retirement income, and that is the protection it affords for a worker's family in the event that he dies before reaching age 65. Under these circumstances the money which has accrued to his social security account will be used to pay his family survivor benefits.

These benefits are payable in monthly income or lump sum payments, and an outline of benefits available will be given below. In all cases, survivors benefits are based on the worker's primary insurance benefit, that is the amount obtained in line 6 of the formula used for figuring the worker's benefits.

Schedule of Survivor Benefits

Monthly benefits are payable to survivors of fully insured workers as follows:

1. Children of the deceased worker receive monthly

Arnold Kruckman's

Washington Letter

Nation's Business on Dead Center

COMMENTS coming into the capital from all parts of the country indicate that congressmen will find a rather critical welcome back home. Voters apparently want to know why it took so many months to produce so little substantial legislation of such thin value. They want to know what really is the matter with Congress, and why it did not revoke the excise taxes and make other changes in the tax laws which would not have materially reduced revenues, but would have made things easier for the average businessman. They demand to know why Congress can't do something about the onerous burden of reports and statements which the various bureaus and agencies in Washington compel most businesses to supply the year 'round. Congressmen will find that some very good answers must be given to many of these queries if they expect to be re-elected with the votes, influences, and campaign contributions of average businessmen. Every congressman must stand for re-election next year. One-third of the membership of the Senate comes up for re-election.

Socialization Trend

It is generally assumed in Administration quarters that the labor unions, farmers, and liberals will make an intensive campaign to put into Congress those who are wanted by the White House, and who are ready to cooperate on legislation. This obviously means more socialization. The president, who will run in 1952, thinks the recent result in Scandinavia, in Austria, and the popularity of socialization in England, indicate that social security measures of all kinds are desired by the working people who constitute the majority in this country, as well as in other parts of the western world.

A New Americanism

The people who have the greatest influence here think that the levelling process is actively speeding up, and that the so-called middle classes are finding their level closer to those of the classes who are coming up. Pensions, insurance, maternity protection, socialized medicine, socialized housing, and similar measures are regarded by the President and his colleagues as much a part of the politico-economy of the nation as is governmental control of water, and governmental administration of certain health safety, fire protection, and other safety measures. They profess not to see that this socialization is a wide swing from the role of umpire which the Federal Government was supposed to play, according to the original theories upon which our government was build. It is curious that a man who considers himself as basically American as the Missouri-bred President is able to accept the doctrine that government in our system is not simply the arbiter, but is the source which must determine what is good for us, and make us like it. Of course, the power of this philosophy stems from the huge voting groups in the cities, abetted with numbers but with less enthusiasm by the rural communities. Apparently the Americanism of today is entirely different in almost every sense from the Americanism of the vigorous, adventurous years which built this country to that point where it had arrived in 1914, just before World War I. You can sense the difference in the two kinds of America when you associate with the veterans of the first World War and with those who came out of the second.

Government Control?

Here in Washington they still say they are certain the steel strike will be settled soon. But, there does not seem to be as much assurance behind the insistence as there has been in the past. The impression comes through more strongly that the President will have to do something about it. Since CIO's Phil Murray is regarded as one of the President's most valued advisors; and since the CIO is expected to wield great influence in next year's election, it is not likely the President will do anything to embarrass Mr. Murray, or to make him lose face. Therefore, it seems unlikely that Mr. Truman will resort to the Taft-Hartley injunctive power, by which he might compel the strikers to go back to work. It seems more possible that he will use those powers given him more than a year ago, in the event an emergency might make it necessary for him to take over the steel plants. In that event it would be very easy for Mr. Murray to order his strikers to go back to work: and neither he nor his strikers would lose face.

Washington Letter

The statement recently issued by Commerce Secretary Sawyer has many earmarks of blazing a trail for Presidential action. Mr. Sawyer said:

"Until about two weeks ago, during practically the entire summer there was a definite uptrend in business and employment. That trend has been changed by strikes and threats of strikes.

"The steel strike, which began October 1st, has resulted in a curtailment in steel production to 10 per cent of capacity. At the beginning of the strike, the average inventories of steel products in the hands of metal-consuming industries were estimated to be sufficient to last until approximately November 15th. Should the strike continue, it is expected that shortly after that date 80 per cent of the production of these steel-consuming industries will be lost, with serious damage to the nation's economy.

Unemployment Rising

"From estimates made by the Department of Commerce, based on recent surveys, it appears that even by November 1st the strike, if continued, will cause the unemployment of approximately 2,000,000 workers in the metal-working and other industries, including the steel workers on strike. From November 1st on, unemployment will increase at an accelerated rate. Between November 1st and 15th, according to available information on inventories of iron and steel in the hands of users, the mass production industries, such as the automotive, metal container, machinery, electric appliance and construction industries will find it necessary to reduce the number of their workers drastically. By December 1st, if the strike continues, unemployment directly attributable to the strike will be approximately 5,000,000. Furthermore, it is estimated by January 1st, there will, in effect, be a complete shut-down of the metal-consuming industries.

"I am particularly concerned for more than 200,000 small manufacturers and the additional thousands of service establishments which depend upon frequent steel inventory replacement for their existence.

Threat to Small Business

"Small fabricators and other businesses directly or indirectly dependent upon iron and steel supplies, have successfully weathered the storm of post-war readjustments, but in so doing have drawn heavily on their financial resources. For the most part, smaller firms depend upon fast distribution of free stocks of steel to meet their operating needs. Stoppage of the flow of stocks to these small concerns will interrupt operations more quickly and seriously than larger concerns.

"Current reports coming to the Department of Commerce suggest that many small firms will be forced to close their plants if steel inventory replacements do not become available before November 15th, and far too many of these firms will not have the capital to reopen.

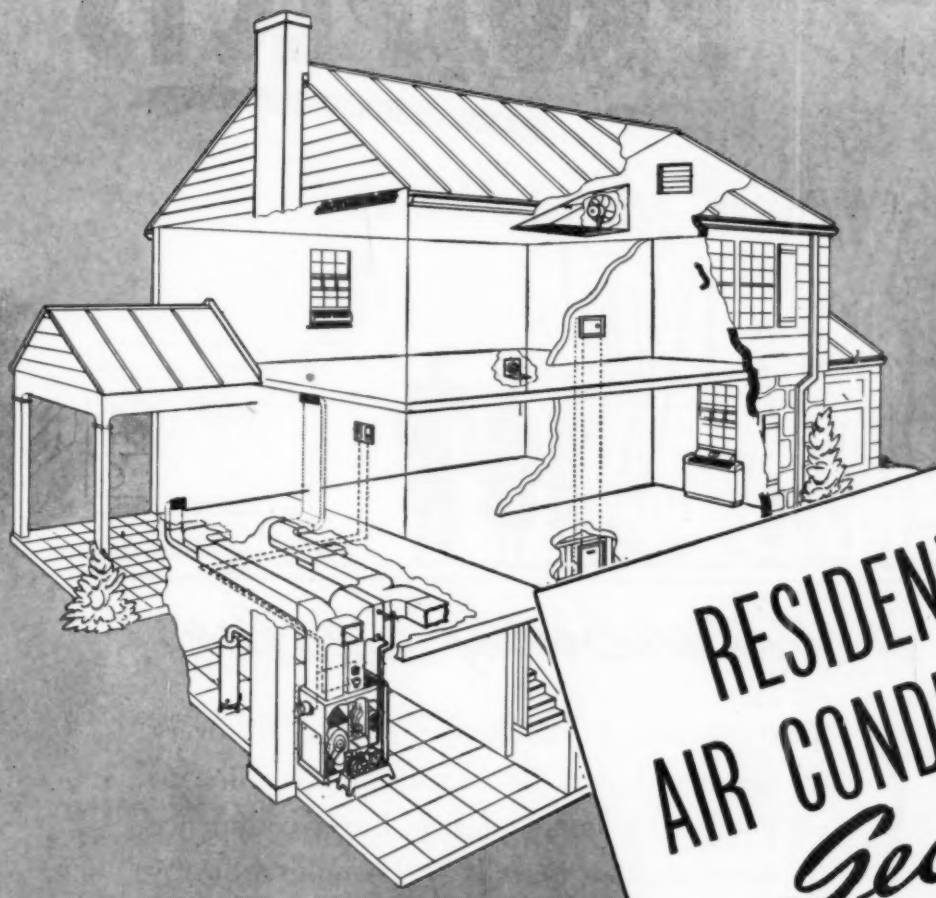
"Small businesses are peculiarly susceptible to interruptions and dislocations. The failure of a small business is particularly serious since the small businessman who has failed cannot easily re-establish his business. The growth in numbers of small businesses since the war has been one of the healthiest characteristics of our economy. It would be tragic if this trend were reversed."

In Pittsburgh this correspondent recently found an entirely different point of view about the steel strike than prevails in Washington. In the clubs, and among leading steel people themselves, the sentiment was that it would be a long strike. They felt that this might just as well be the time for a showdown with labor as any other. They believed they would never be in a better position, either from a business standpoint or from the standpoint of public sympathy interest. They seemed to feel the socialization issue might be thoroughly washed out or washed up in the process of settling this strike. Naturally, they consider the coal strike and John Lewis as a full-fledged part of this whole mess. The genuine seriousness with which interested Pittsburghers contemplate the entire prospect makes one really wonder where this complicated strike situation may terminate. It has profoundly grave implications. It might have a very unexpected effect upon our social structure as well as our political fabric and our economics.

1950 Upswing Foreseen

They pointed out in Pittsburgh that construction already is feeling the pinch; and that auto production must slow down almost immediately. The feeling is that all household and housing equipment will suffer acutely in the immediate future. On the other hand, however, the revived demand for the commodities that are getting short is so great that it is accepted as a matter of faith that there will be a big boom after the strikes when the goods are again available. The feeling both here and in Pittsburgh is that after the strike steel production will run to capacity, and that business in 1950 will be phenomenal. An angle that is getting more and more attention is the bitterness between Murray and Lewis which is part of this strike. Lewis, Murray's

(Please turn to page 148)



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Electronic Control Systems

Comfort Control With Electrons

Part 3 of a Series

EDWIN F. SNYDER

Minneapolis-Honeywell Regulator Company

Having previously described the application of electronics to comfort control, the author here gives a more detailed analysis of the types of controls and their functions.

FIRST major point covered in this series was the principle of operation of an electronic circuit. A brief description of a comfort heating control system followed. Now a more detailed analysis of the control system will be presented.

Fig. 5 is the same diagram as Fig. 4, which appeared in the previous installment, but in slightly different form. Points *R* and *G* form the opposite points of the bridge and the transformer is connected across the other two points. The amplifier tubes are across *R* to *G*, in the same position occupied by the galvanometer shown in previous illustrations.

In this circuit, unbalance of the bridge causes a change in potential between *R* and *G*, which in turn changes the signal on the grid in the first stage of amplification. The change in signal on the grid controls the amount of electron flow between cathode and plate, in this first stage. This change in strength is amplified through additional stages and finally is fed to the coil of a load relay or switch which controls the heat source. The strength of this signal is varied so that in order to close the relay, the coil voltage reaches about 45 volts, dc. The relay is so adjusted that it will drop out when the relay coil voltage drops to about 25 volts, dc. In this manner, the control system can be said to have a differential of about 20 volts, dc.

In an earlier discussion it was indicated that two thermostats might be more effective than one and Fig. 5 shows two thermostats between the two points marked *T*. The two 500 ohm thermostats, with their 72 ohm control point adjustment, are the only elements in this leg of the Wheatstone Bridge. This constitutes a 1000 ohm leg. Any number of thermostats could be used if they were wired in series in the manner shown, had the same resistance value, the sum of their resistances equaled 1000 ohms plus 72 ohms for control point adjustment and they constituted the only elements in this leg of the Wheatstone Bridge. The result would be a control point that would represent the average of conditions at all thermostats. However, the practical difficulties involved in

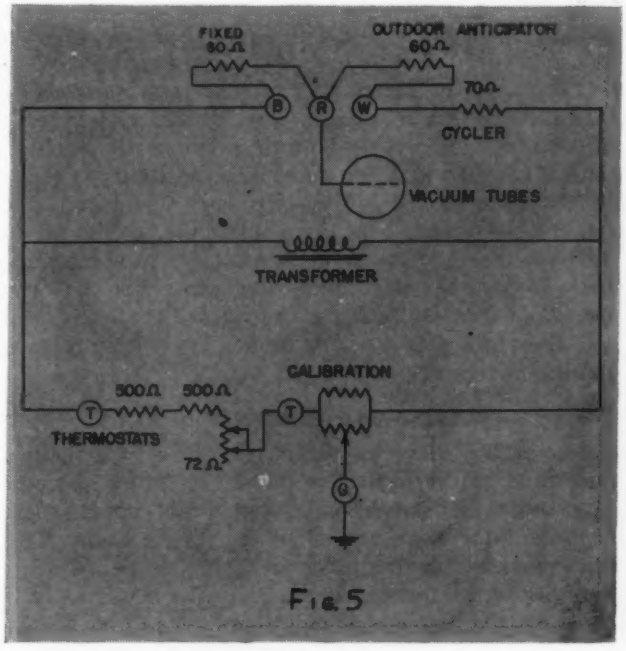
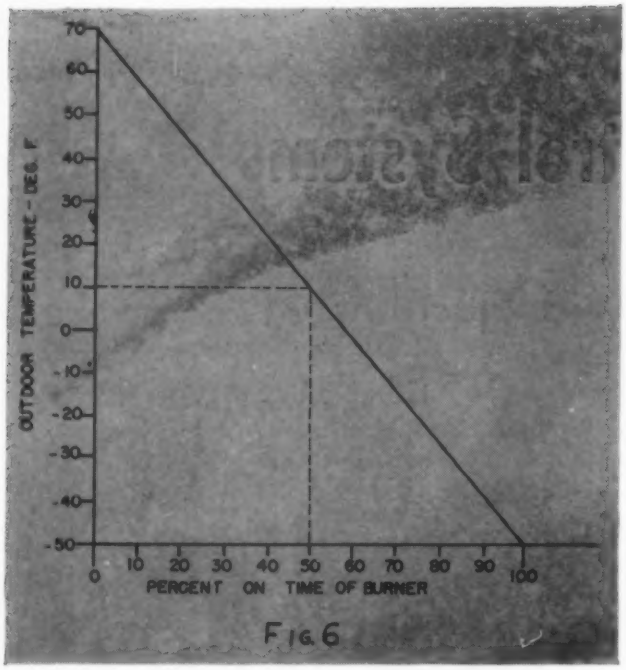


Fig. 5



locating more than one thermostat in the average structure normally restrict the use to either one or two.

Another important factor is sensitivity. The differential of this system has already been mentioned as 20 volts but no reference has been made to temperature differential. Vacuum tubes used in this system have sufficient amplification so that a net change in resistance in the bridge of 0.6 ohm will cause the 20 volt change in the relay coil. The temperature sensitive wire used in the thermostatic sensing elements has a coefficient of 0.0024 ohms per ohm per F. In other words, for every ohm resistance in the wire at a given temperature, the resistance will change 0.0024 ohms for every 1 F change in temperature. For example, if a certain element has a resistance of 1000 ohms at 70 F and the temperature is increased to 71 F the resistance will increase by 2.4 ohms (1000 x 0.0024 x 1).

Since the change in relay coil voltage of 20 volts, from pull-in to drop-out, can be accomplished by a change in resistance of 0.6 ohm, then the temperature differential of the system is 0.6/2.4 = 0.25 or ¼ F. With a differential of about 1.5 F in the best mechanical thermostats, this represents a sensitivity to temperature change hitherto unknown in domestic comfort control systems. Another concept of sensitivity is based on the mass of the sensing element. Comparing the mass of the sensing wire in an electronic thermostat to the mass of the bi-metal or bellows element in a standard, mechanical type thermostat will show that the electronic element has less than 1/100 the mass, and can therefore respond that much more rapidly to a change in temperature.

Securing Even Heat Input

One of the most important elements in a control system of this type is the means by which periodic heat input may be accomplished, even though there is no call for heat by one of the thermostats. This feature is highly desirable so that the temperature and flow of the heating medium may be kept relatively constant for any given condition of load.

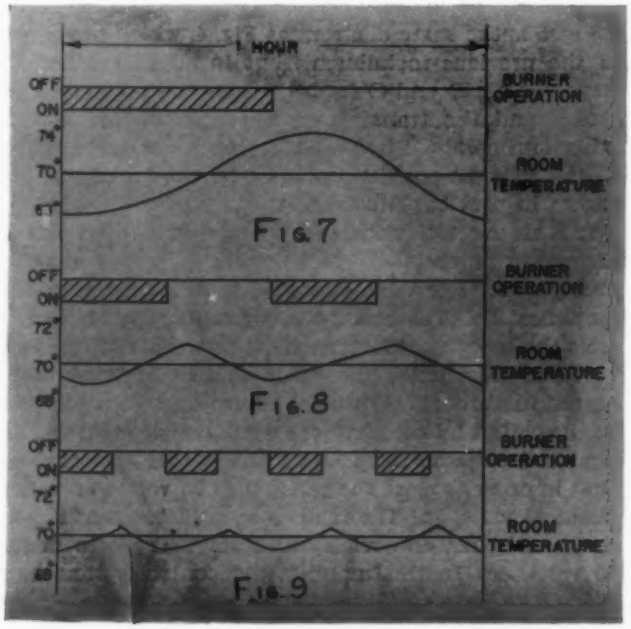
Fig. 6 shows the importance of the cycling device. This figure shows a load line that can be drawn for any automatically fired heating system, neglecting sun and wind loads that are other than normal. In this case 70 F has been considered as the fadeout or no-heat temperature and -50 F the design temperature of the heating system involved. Then, for any outdoor temperature, reference to the chart will give a very close indication of the percentage of the time that the burner will operate in order to maintain the temperature at approximately 70 F, within the structure. Remember that although heat losses are occurring at a steady rate from the structure, heat replacement is an intermittent operation because the greatest majority of domestic burners are of the on-off, not the modulating, type. The dotted lines in Fig. 6 indicate that when the outdoor temperature is 10 F the burner would operate about 50 per cent of the time.

Fig. 7 graphically demonstrates the operation of the burner and the resulting room temperature conditions under 50 per cent load with an average control system. The temperatures shown are arbitrary as to value, but they do indicate that there will be considerable variation in room temperature. In Fig. 8 the heating load is still 50 per cent but the burner operations are shorter and more frequent.

Obviously, the room temperature is going to swing less violently as indicated. Fig. 9 shows the same picture with still shorter and more frequent operations. Of course, there is ultimately a frequency that cannot be exceeded because of efficiency and operating considerations so this illustration should not be carried much farther.

Electronic Cycler

Automatic controls have been available for a number of years that would allow periodic operation of the burner along a prearranged mechanical pattern that was the same for any load condition. But, obviously, it is desirable to vary the length and frequency as the load varies. Fig. 10 shows, schematically, an electronic cycler that is a part of the control system under dis-



cussion. The cycler consists of a bridge element which is also seen in Fig. 5, an electric resistance heater, a switch and a power source, in this case a transformer. In operation, the switch is part of the same relay which starts and stops the burner. It closes when the burner is started and opens when the burner is stopped. When the switch is closed, the heater is energized and it in turn heats up the bridge element which is made of the same temperature sensitive wire as the thermostats. When this bridge element is heated its electrical resistance of course, increases. Conversely, when the switch is opened, the heater is de-energized and begins to cool.

Cycling Is Automatic

As the heater cools, the bridge element also cools and its electrical resistance decreases. Since this cycler bridge element is located in the bridge leg diagonally opposite the one in which the thermostats are found, it has exactly the same effect upon the bridge balance as do the thermostats themselves. Therefore,

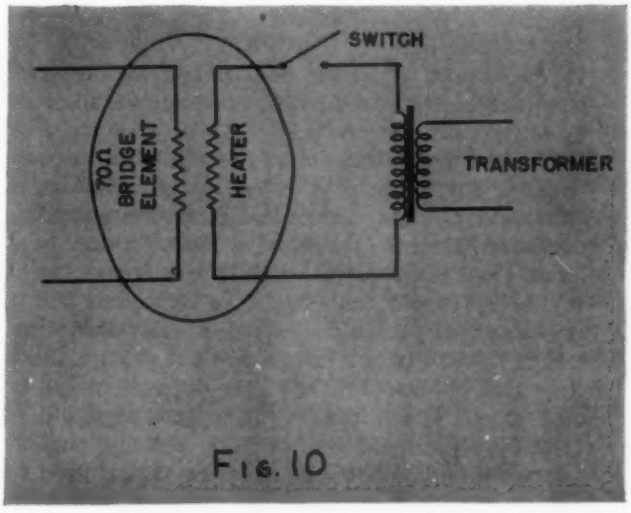


Fig. 10

it follows that as the electrical resistance of this cycler bridge element increases and decreases, it tends to periodically balance and unbalance the bridge even though there is absolutely no change in temperature at the thermostats. This, then, automatically sets up a cycling rate for the burner. The question then arises as to how this cycling rate is automatically varied as the heating load changes.

Use of Outdoor Control

The instant the heating load varies the change is felt by the outdoor anticipator, which consists of a bobbin of temperature sensitive wire located outdoors and wired into the bridge in the same leg as the cycler bridge element. The electrical resistance of the outdoor anticipator decreases if the heating load increases and unbalances the bridge circuit. The cycler heater then must remain energized a longer time, heating the cycler bridge element to a higher temperature in order to restore the bridge to its condition of balance. And since this element follows the normal cooling curve, the result will be a more rapid unbalancing of the bridge as the cycler bridge element cools. The net

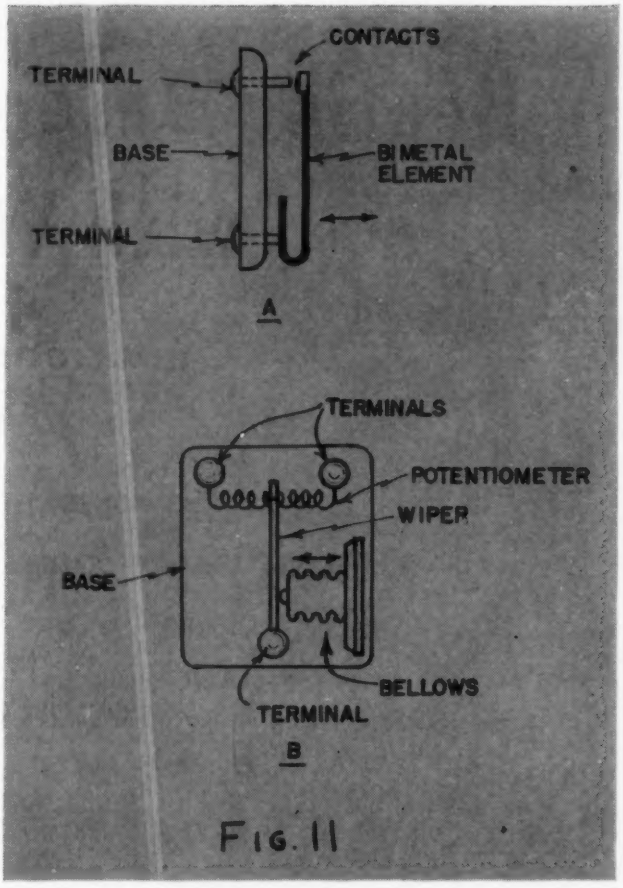


Fig. 11

result is to increase the length of the burner on cycles and decrease the length of the off cycles.

A question might logically be raised at this point as to what happens if the cycling rate thus set up is not the right one due to other conditions present. If this were the case, the tendency would be to change the temperature at the thermostats which would in turn change their resistance. And since they are located in the bridge leg diagonally opposite from the cycler and outdoor anticipator they would modify the action of the cycler and outdoor anticipator enough to maintain the desired temperature. Furthermore, since the thermostats would have roughly fifteen times the nominal resistance of the cycler or outdoor anticipator, 1/15 F change at the thermostats would have the same effect on the bridge balance as 1 F change at the cycler or outdoor anticipator.

By the same token, the system will not continue to cycle as the outdoor temperature rises since a very small rise in temperature above the control point at the thermostat will cause the control system to shut the heat source down completely.

Any thermostatic control system has a feature known as "droop" which is not desirable, and every effort is made to keep it as small as possible. In order to understand droop and its effect, consider the operation of two standard mechanical thermostats shown in Fig. 11-A and 11-B. Under normal operation, the bimetal shown in the thermostat in Fig. 11-A causes the moving contact to meet the fixed contact and thus complete the circuit to the heat source as the temperature at the thermostat falls. The heat source causes

(Please turn to page 162)

Heating Basementless Houses with Warm Air

Questions & Answers

PART 4

S. KONZO*, W. R. HEDRICK** and
J. M. DAVID***
University of Illinois

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In the basementless structure, since the furnace is located on the first floor, any heat loss from the bonnet and distribution ducts will be used directly for offsetting heat losses from the rooms. Therefore, the bonnet output of the furnace must be equal to or greater than the total heat loss of the structure, including floor loss. So, in the example shown in Fig. 6b, in which heat loss above ground is 41,000 Btu per hour and floor loss for 1 in. edge insulation is 8,960 Btu per hour, the total heat loss is 49,960 Btu per hour. Required output is therefore about 50,000 Btu per hour. Required input is 50,000 divided by 0.8 or 62,500 Btu per hour. In the examples shown in Fig. 6 the furnace required for the basementless home is not smaller than that required for the home with a basement, both of which have the same heat loss above ground level. Apparently, the floor slab heat loss was equal to the heat loss from ducts between the bonnet and register in the home with a basement.

Q 12. *Fuel Costs.* What will be the expected fuel consumption as compared with the same house heated by conventional means?

A. No factual and reliable data are available on comparative fuel costs of a given house heated by a conventional warm air system and by a warm air perimeter system. However, a study of the heat losses from the structure should give some clue as to the difference that might be expected. For a typical small structure having a calculated heat loss of 50,000 Btu per hour above the ground and a floor area of about 1080 sq ft, the dimensions will be 30 by 36 ft. The linear feet of exposed edge will be 2 (30 plus 36) or 132 ft. Assuming a design outdoor temperature of —10 F, the edge loss factor given by the University of Illinois tests on slab floors indicates a value of about 55 Btu per lineal ft of edge per hour. Hence, the floor heat loss for a conventionally heated structure will be about 55 x 132 or 7,260 Btu per hour. That is, the floor loss is about 12.7 per cent of the total heat loss of 57,260 Btu per hour.

In the perimeter warm air system the factor that has been estimated is about 80 Btu per lineal ft of edge per hour. If this value is approximately correct, the floor edge loss becomes 80 x 132 or 10,560 Btu per hour, or 17.5 per cent of the total heat loss of 60,560 Btu per hour. Difference between the floor heat losses for the two cases is about 3300 Btu per hour, or about 5.5 per cent of the total heat loss of the conventionally heated structure. There should be a slightly greater fuel consumption for the structure heated with a perimeter warm air system, as compared with the same structure heated by a conventional warm air system. The difference is not large, but indicates that heating the floor will only

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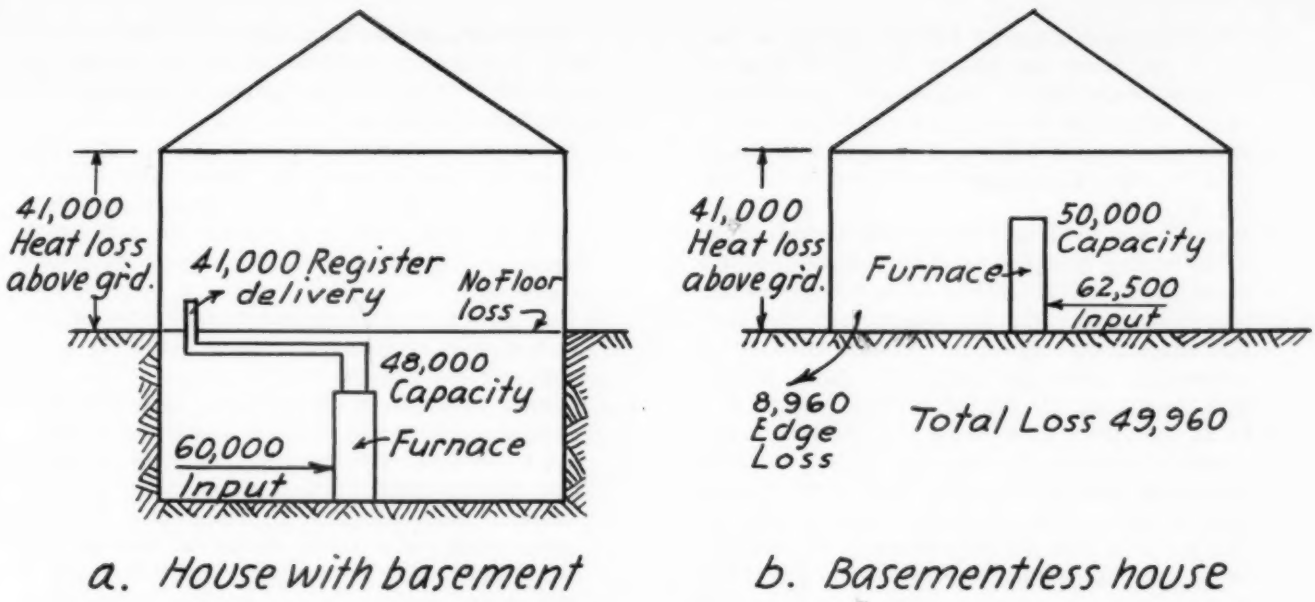

Fig. 6 Furnace sizing for 2 types of houses.

be accomplished with some extra consumption of fuel.

The above calculations were made on a basis of 1 in. insulation at the edge of the slab floor. The use of 2 in. edge insulation should result in an edge heat loss of 8500 Btu per hour for this example, instead of the 10,560 Btu per hour previously stated.

Values and percentages in the preceding example are based entirely on —10 F design weather conditions. A study of the original report on slab floors made at the University of Illinois indicates a trend that may have some influence on the percentage values that will be obtained in practice. For example, it was found that the heat loss factor did not decrease proportionally with indoor-outdoor temperature difference. That is, although the calculated heat loss above ground decreased in proportion as the indoor-outdoor temperature difference became smaller, floor edge loss decreased at a much slower rate. So, when the outdoor temperature was 20 F the factor had decreased to only about 45, from its original value of 55 for a —10 F condition. Indications are that edge loss from the floor may be proportionally a much larger percentage of the total heat loss when the weather is milder than design temperature. If this is the case, percentage differences stated in the preceding examples are all on the low side. The final proof awaits actual test results conducted under controlled conditions, and it will be interesting to see whether the predictions made are verified in a field installation.

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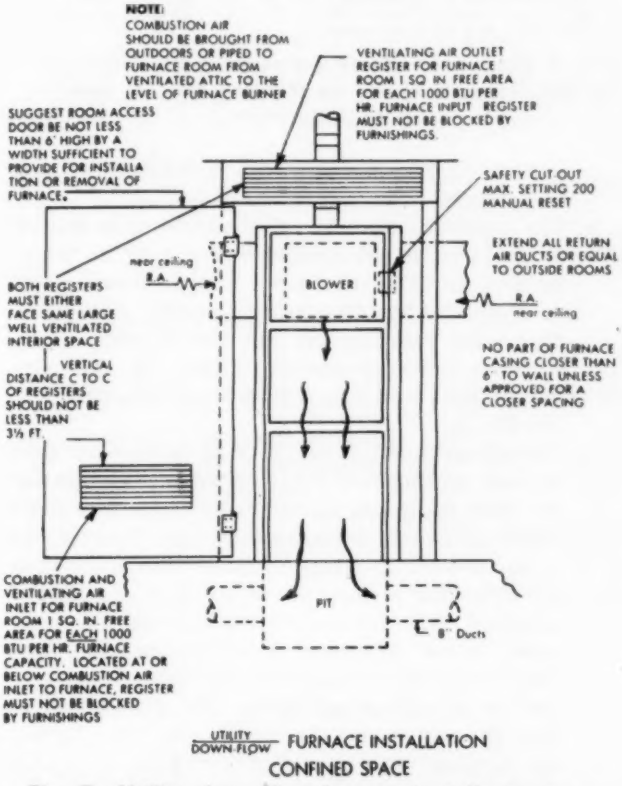
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UTILITY DOWN-FLOW FURNACE INSTALLATION
CONFINED SPACE

Fig. 7 Utility down-flow furnace installation in a confined space. ***(Courtesy of the National Warm Air Heating and Air Conditioning Association and the American Gas Association.)***

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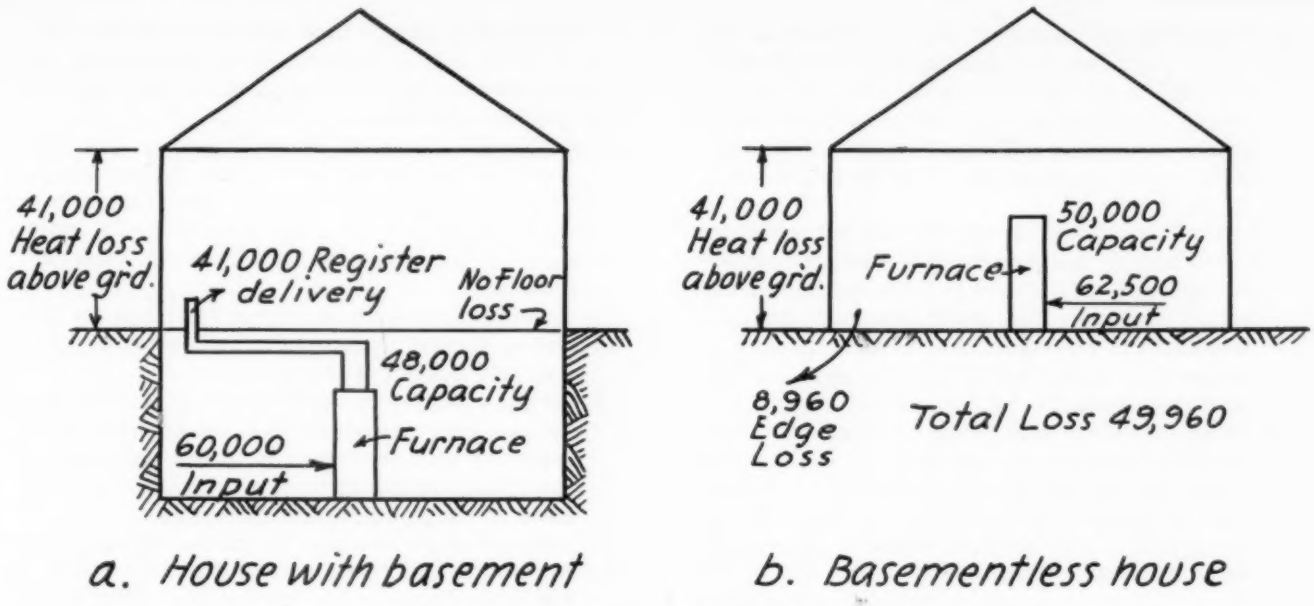

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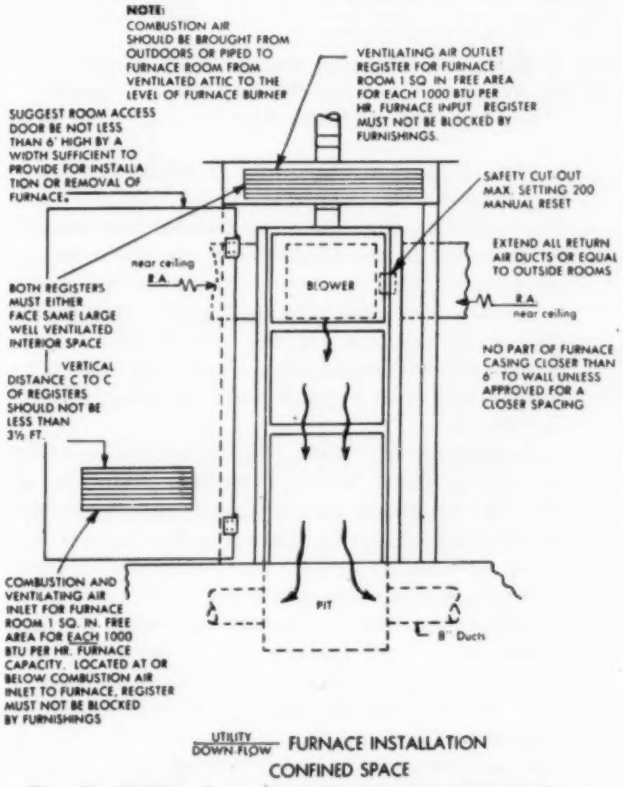
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b. A separate ventilating air outlet is located at the top of the closet, and has the same free area as the inlet to the closet. This opening permits the escape of heated air from the closet, and is intended as a safety feature. The vertical distance between the two openings should be greater than 3½ ft.

c. Return air is to be carried through ducts leading to the blower, and should not be dumped into the closet space. If the duct is omitted between the return air intake and the blower inlet, the suction effect of the blower may reverse the flow of combustion gases and permit the gases to mix with circulating air for the heating system.

d. In an extremely tight house the combustion air entering through the openings of the furnace closet may not be sufficient. That is, the burner may be starved for air. *Good practice calls for the use of a separate duct piped to the furnace room from the ventilated attic to the level of the burner.* This is a safety measure and a most important one. Even with the use of this combustion air duct, the openings in the doors should be provided.

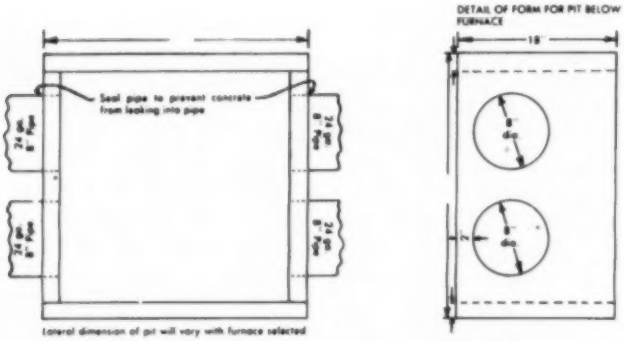

DETAIL OF FORM FOR PIT BELOW FURNACE
18"
Seal pipe to prevent concrete from leaking into pipe
Lateral dimension of pit will vary with furnace selected

Fig. 8 Details of collecting plenum or pit. ***(Courtesy of the National Warm Air Heating and Air Conditioning Association.)***

c. The collecting plenum below the furnace should be as large as practicable and should be made water-tight. Use of a vapor barrier between the concrete and the fill is recommended. Any water that leaks into the pit will give trouble. Construction recommendations made for the perimeter duct also apply to this pit construction. See Fig. 8.

f. The conventional, hi-boy type of furnace can also be used, as shown in Fig. 9. Recommendations of the AGA apply also to this installation. Since the warm air issuing from the top of the furnace has to be reversed in direction and then delivered to the collecting plenum below the floor, a source of pressure loss exists in the 180 deg bend. A long-sweep elbow will have a smaller pressure loss than will a sharp elbow. In any case, the use of two or three turning vanes is recommended to ease the air around the sharp turn. The duct in the furnace room should preferably be insulated with a layer of air-cell asbestos.

Q. 14. *Control Equipment.* Are special controls necessary?

A. Experience gained thus far in a number of field installations indicates that control equipment normally used in conventional forced air systems is satisfactory. The control equipment consists usually of the following items:

a. Room thermostat of heat-anticipating type. No need has been indicated for outdoor thermostats connected in parallel with the room thermostat, since the large time lags experienced with some concrete floor panel systems have not been encountered.

b. Combustion controls of conventional type for gas and oil fired equipment have been used for ignition and safety requirements.

c. Blower switches of conventional type with adjustable cut-in and cut-out points have been used. As with conventional forced air systems, the recommended method of operation is indicated in the Continuous Air Circulation (C-A-C) program of the National Warm Air Heating and Air Conditioning Association. In other words a cut-in temperature for the furnace blower of 85 to 100 F is recommended.

If baseboard registers are used in place of floor or high sidewall registers, the cut-in temperatures will probably have to be increased, since the low temperature air issuing from the registers may result in drafts in the living zone.

d. Limit switches or safety cut-out switches are necessary. In case of blower stoppage due to broken fan belt or thermal overload protection on the blower motor, the circulation of air over the heat exchanger will stop. If the burner is not cut off under this condition the furnace will become overheated, unless a limit switch is provided. In the furnace arrangement in which warm air leaves the top of the casing, the limit switch can be located in its usual place; namely at some point in the upper part of the casing. However, in the furnace in which air is discharged downwards over the heat exchanger, stopping the blower will cause the furnace to reverse its air circulation. A safety cut-out switch is necessary above the heat exchanger and near the blower to protect it from excessively high temperatures. In addition, another limit switch is necessary below the heat exchanger to shut off the burner if air temperatures become excessive during normal operation. Due to the nature of the duct construction, in which ducts are completely surrounded by concrete, and practically no wood surfaces are in contact with hot surfaces, limit switches are provided primarily to protect the equipment from excessive temperatures, and only secondarily to protect against overheating of combustible material near ducts.

In common with all equipment located in utility rooms on the first story, the blower and burner must be quiet in operation, much more so than in a basement installation. In this connection, the relatively low speed, continuous type of blower operation that accompanies the C-A-C program is definitely preferred over the high speed, intermittent blower operation that has been common in the past. Burner manufacturers will be called upon to provide the utmost in quiet

operation of all fuel burning equipment; the problem is not easy to solve.

Q. 15. *Surface Temperatures of Floor.* Will surface temperatures of the floor be too high for comfort?

A. The maximum value that will be attained by the floor surface temperature is of great interest to the heating engineer. Panel heating effect, as will be shown later, increases as the surface temperature increases. In Table 1 of the design procedure, previously published (AA, Oct. '49), this panel heating effect was estimated and included with the convection heating effect to be expected from the register. Fortunately, a considerable error in estimating the panel heating effect will not appreciably affect the capacity values in the table, which were conservatively estimated.

Floor Temperature Important

The maximum surface temperature that can be expected is also of interest from the standpoint of foot comfort. The highest safe surface temperatures, as given by the Guide of the American Society of Heating and Ventilating Engineers, are 120 F for borders and aisles of rooms and only 85 F for the main portion of the rooms. If, with the construction proposed in this series of articles, floor surface temperatures along the borders of the room tended to exceed 120 F, then it would have been necessary to reduce the air temperature at the bonnet. Any such reduction would require a larger air delivery than could be normally expected from a conventional warm air furnace. Hence, it became necessary to estimate the probable surface temperatures that would have been attained if the bonnet air temperature was 165 F.

The assumptions made in the calculations to follow were purposely made on the extreme side. If surface temperatures were reasonable under these extreme conditions, then little difficulty would be anticipated in practice. The extreme would be represented by a floor slab, as shown in Fig. 10a, consisting of a 2 in. concrete slab over a wide air channel through which heated air is flowing. Here, t_a and t_s represent the temperatures of the circulating air and the floor surface, respectively. The heat flow that occurs from t_a to t_s must be equal to that transmitted from the floor surface to the room. In other words, for one sq ft of floor surface,

$h_p = U_f (t_a - t_s)$

in which,

h_p is the panel heating effect in Btuh/sq ft

U_f is the overall heat transfer coefficient, Btuh/sq ft/F

The value of h_p can be evaluated if the value of t_s is known, as shown in the discussion under Question 16. The problem consists in calculating the overall coefficient of heat transfer U_f from the given construction. The method used in obtaining U_f is substantially the same as that normally used to find U values for wall constructions.

The actual construction is shown in Fig. 10b, and it may be noted that instead of a wide channel, an 8 in. dia. pipe now carries the air. Heat flow in this case is bound to be highest over the centerline of

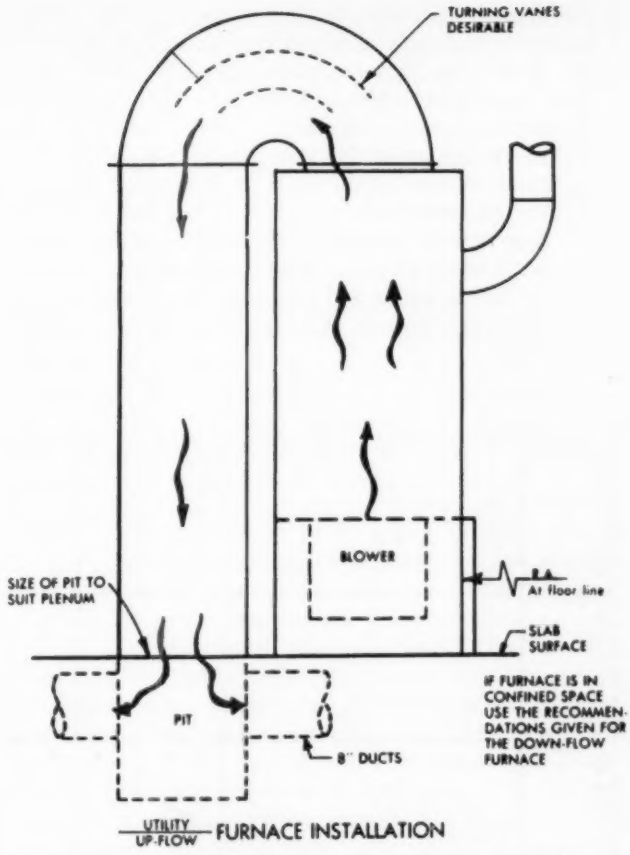

TURNING VANES DESIRABLE
BLOWER
SIZE OF PIT TO SUIT PLENUM
R.A. Air floor line
SLAB SURFACE
IF FURNACE IS IN CONFINED SPACE USE THE RECOMMENDATIONS GIVEN FOR THE DOWN-FLOW FURNACE
PIT
8" DUCTS
UTILITY UP-FLOW FURNACE INSTALLATION

Fig. 9 Utility up-flow furnace installation. (Courtesy of the National Warm Air Heating and Air Conditioning Association.)

the duct and taper off towards the edges of the pipe. Some amount of heat flow is also going to take place away from the 12 in. wide slab assumed as the effective width. Any heat conduction sideways along the slab will tend to make the value of t_s

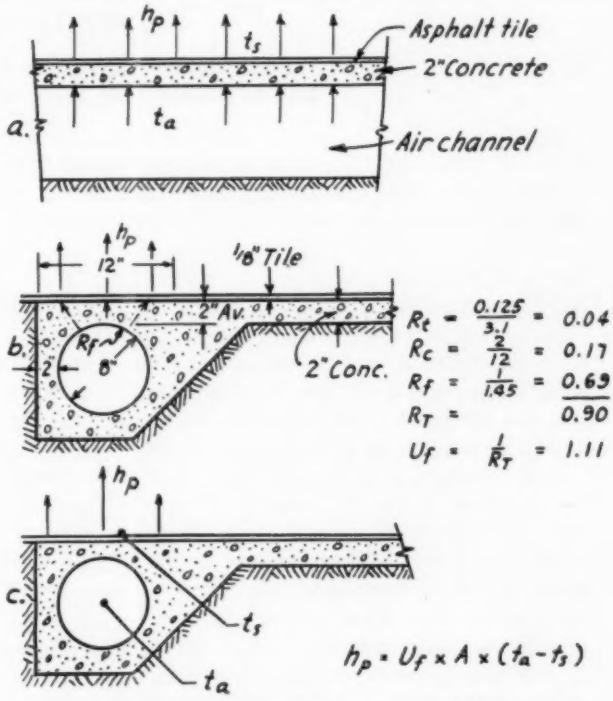


Fig. 10 Surface temperatures as related to air temperature.

lower than that calculated. We are primarily interested in the maximum surface temperature over the pipe. For this condition the heat flow takes place through a series of resistances, as follows:

R_t the resistance of the asphalt tile is 0.040

R_c the resistance of the 2 in. concrete slab is 0.17

R_d the resistance of the metal duct is negligible

R_f the resistance of the air film on the inside of the duct can be evaluated from an equation given in McAdam's text on Heat Transmission. For an air temperature of 140 F and an air velocity of 440 ft per minute the resistance value is about 0.69

R_t is the total of all the resistances and equals 0.90

U_t is equal to $1/R_t$ and is equal to about 1.11

The original equation given above can be simplified to:

$h_p = 1.11\ (t_s - t_a)$

By a series of calculations in which t_s is assumed and h_p is determined from Table 2 (AA, Oct. '49), then values of t_s can be calculated. The relationship between the air temperature inside the duct and the surface temperature of the slab floor can be shown by a curve as given in Fig. 11.

The interesting feature of the curve is the large temperature difference between the air in the duct and the surface temperature of the floor. For example, with an air temperature of 140 F inside the duct, the floor surface is only 100 F. As indicated previously, the actual floor surface temperature should not come up even to this value. Later tests in the new research residence may show how closely the actual results agree with these calculated values.

From the curve in Fig. 11, some possibility exists for obtaining surface temperatures over the feeder ducts that may be excessively high. This fact should be kept in mind. It is true that a narrow band of warm floor surface is not going to be as objectionable as an entire floor heated above 85 F. Nevertheless, some attention should be directed toward placing the feeder ducts below that part of the room where the occupant will not be standing for any long periods. Ordinarily, a feeder duct running through the middle of a living room may not prove objectionable, since there is always the possibility of having the occupant move over a small distance

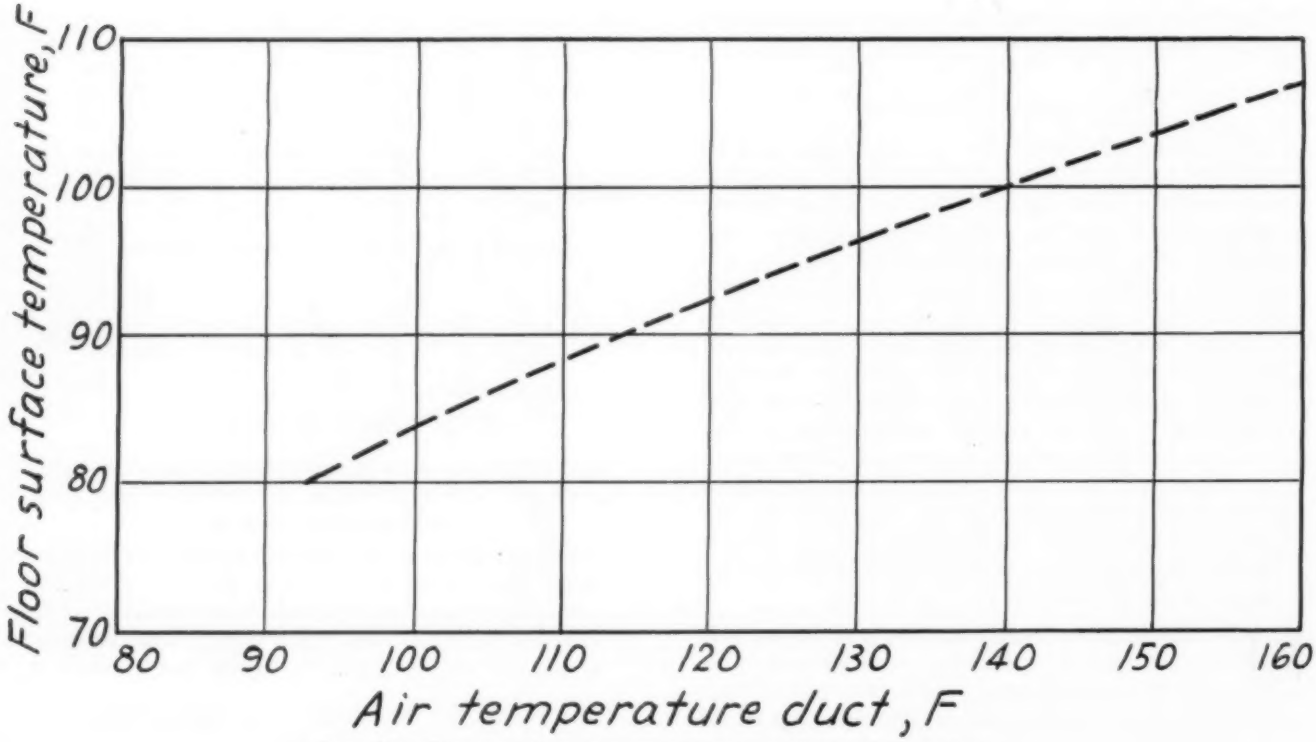


Fig. 11 Floor surface temperatures predicted for various air temperatures in duct. (For 219 cfm flow in 8 in. pipe.)

to avoid the presence of the hot floor.

Rugs and carpets over the feeder ducts will, of course, tend to insulate the floor and diminish the problem of foot discomfort. Furthermore, it should have no appreciable effect as far as the satisfactory operation of the plant is concerned. If less heat escapes from the floor surface by panel heating effect, more becomes available by convection effect from the registers. This self-balancing feature of the perimeter warm air system is characteristic of any system in which panel heating is combined with convection heating.

Q. 16. *Panel Heating Effect.* What will be the approximate panel heating effect from the floor surface over the perimeter duct?

A. As explained in the preceding item, the panel heating effect depends upon the surface temperature of the panel. This surface temperature, in turn, depends upon the temperature of the air flowing in

(Please turn to page 156)

Draft Control Installation Short-Cut

E. A. FIELD

Field Control Div., Mendota, Illinois

AFTER making a few draft control installations, a service man soon learns that it is easy to fasten the collar of a round control to a pipe an inch or so larger or smaller than the control. Also a round collar can be attached to a round or oval pipe, without cracks or openings at the joint, if the two diameters do not differ by more than 20 per cent.

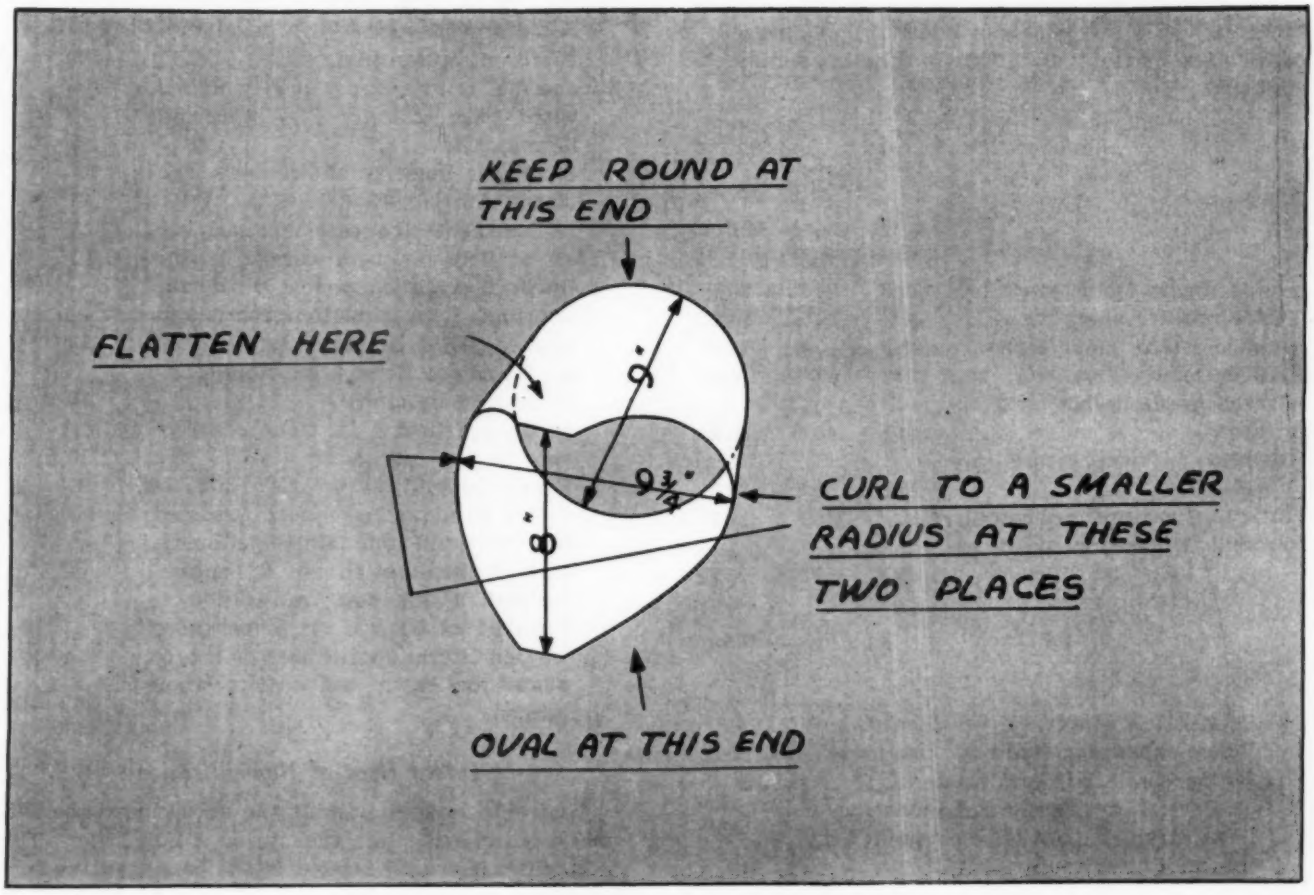
To make such an installation it is necessary to shape the collar by hand before fastening it to the pipe. The way to do this is to slip the collar on to the ring of the draft control and then squeeze the pointed end, making it oval in shape. If it is squeezed enough, so that the collar will remain oval before it is attached to the pipe, little difficulty will be encountered. On the other hand, if the strap is used to pull the collar tightly against the pipe, there is a possibility that the joint will not fit as tightly as it should.

The way to shape the collar of a 9 in. control to fit an 8 in. pipe is shown on the sketch. It requires but a minute or two and is easily done.

Since a control can be installed on several sizes of pipes, reductions in the number of sizes have been made by several draft control manufacturers, with definite advantages for those who stock controls.

Perhaps the greatest advantage is that the cost of the controls can be kept lower because of greater volume for the remaining sizes. If a great number of sizes were to be produced, costs would rise. In fact, it might be possible that a control designed especially for some intermediate pipe size would cost more than a larger regulator, and instead of saving money through the use of a regulator of the same size as the flue pipe, it might be more inexpensive.

Still another reason why the combination controls are better relates to the problem of stocking a large number of sizes, thus increasing inventories. The installation crews would need to know in advance the exact size of flue pipe for each individual job, or else carry several sizes of controls with them. If a survey were not made in advance, there would be cases where the installation men might have to make a second trip in order to install the draft control.



Fundamentals Of Calculating Heating And Cooling Loads

PART THREE

JAMES J. LA SALVIA
Cleveland, Ohio

The actual heating load calculations for the same house located in different climates are given in this installment. Construction characteristics of the house are either given or assumed as a basis for the calculations.

AS AN application of the principles already discussed in this series, this article will demonstrate the calculation of heat losses for a modern, two story house located in three varying climates, New Orleans, Cleveland, and Minneapolis. The intent is to design a year 'round air conditioning system which will provide *Indoor Comfort* in all seasons.

In order to make these calculations, certain definite information is needed about construction characteristics of the house and certain conditions must be assumed.

Residence Heat Loss

Assume the following:

	New Orleans	Cleveland	Minneapolis
Inside design temperature	70 F	70 F	70 F
Inside relative humidity	30%	30%	30%
Outside design temperature ...	25 F	0 F	–20 F
Outside relative humidity	100%	100%	100%
Garage inside design temperature	40 F	40 F	40 F
Basement temperature (unheated)	75 F	50 F	30 F
Attic temperature (unheated) .	50 F	35 F	25 F
Ground temperature below garage	65 F	40 F	20 F

	Transmission Factor (*U*)
Walls a. Brick veneer, $^{25}/_{32}$ in. insulation board sheathing, studding, 1 in. insulation board, lath and plaster.	.13
b. Dormer over garage same construction except for use of wood siding in place of brick veneer.	.12
c. Attic, brick veneer, $^{25}/_{32}$ in. insulation board on studding	.28
d. Adjoining garage: Plaster on 1 in insulation board, studding, metal lath and plaster.	.18
Roof Asphalt shingles on wood sheathing, on rafters	.53
Ceiling (Second floor) 1 in. insulation board and plaster: 1½ in. insulation board on top of ceiling joists.	.15
Windows a. Double-hung wood windows with storm sash for Cleveland and Minneapolis	.45
b. Double-hung wood windows (no storm sash) for New Orleans	1.13
c. Basement, steel casement sash ...	1.13
Floors a. Bedroom over garage, maple finish flooring on yellow pine subflooring: 1 in. insulation board and plaster ceiling below.	.12
b. Basement floor 4 in. stone concrete on 3 in. cinders	.10
c. Garage floor 4 in. stone concrete on 3 in. cinders	.10
Factor for infiltration (.24 × .075) ..	.018

Storm windows have been assumed for Cleveland and Minneapolis cutting infiltration to ½ of normal amount. Front door infiltration is assumed as 3 air changes per hour whether storm door is used or not, to allow for extra infiltration when opened.

Latent Heat of Humidification

Control of relative humidity in an occupied space is made possible through the use of a humidifier. The humidifier is usually located in the bonnet of the fur-

TABLE 5
Heating Load *New Orleans*

A	B	C	D	E	F	G
Room	Part of Structure or infiltration	Net area sq ft and air volume	Coefficient *U*	Temp. diff.	Heat loss Btuh	Totals Btuh
	Glass	37	1.13	45	1,850	
Living	Glass (door)	18	1.13	45	900	
	Wall	245	.13	45	1,430	
Room	Wall (garage)	113	.18	30	610	
	Floor	295	Common			
	Ceiling	295	Common			
	Inf. 1½ a.c.	3,860 cfh	.018	45	3,120	7,910
	Glass	26	1.13	45	1,300	
Dining	Wall	206	.13	45	2,000	
	Floor	186	Common			
Room	Ceiling	186	Common			
	Inf. 1½ a.c.	2,373 cfh	.018	45	1,920	5,220
	Glass	20	1.13	45	1,000	
	Door	18	.51	45	410	
Kitchen	Wall	136	.13	45	790	
	Wall (garage)	68	.18	30	370	
	Floor (entrance)	9	.10	30	30	
	Floor	157	Common			
	Ceiling	157	Common			
	Inf. 1½ a.c.	2,115 cfh	.018	45	1,720	4,320
	Door	21	.51	45	480	
Entrance	Wall	38	.13	45	220	
Hall	Floor	84	Common			
	Ceiling	84	Common			
	Inf. 3 a.c.	2,118 cfh	.018	45	1,720	2,420
	Glass	6	1.13	45	300	
	Wall	147	.13	45	860	
Lavatory	Wall (garage)	51	.18	30	270	
	Floor (ground)	18	.10	30	50	
	Ceiling (attic)	18	.15	20	50	
	Inf. 1½ a.c.	230 cfh	.018	45	190	1,720
	Glass (outside)	10	1.13	15	+ 500	
	Wall (outside)	298	.18	15	+ 800	
Garage	Doors (outside)	52	.51	15	+ 400	Subtract
	Wall (inside)	342	.18	−30	−1,840	gains from
	Door	18	.51	−30	− 270	losses
	Floor	200	Common			
	Ceiling	200	.15	−30	− 900	
	Inf. 1½ a.c.	3,600 cfh	.018	15	+1,440	130
	Glass	30	1.13	45	1,500	
Bedroom	Wall	322	.13	45	1,880	
No. 1	Floor	242	Common			
	Ceiling	242	.15	20	730	
	Inf. 1½ a.c.	2,904 cfh	.018	45	2,340	6,450
	Glass	30	1.13	45	1,500	
Bedroom	Wall	184	.13	45	1,070	
No. 2	Floor	161	Common			
	Ceiling	161	.15	20	480	
	Inf. 1½ a.c.	1,872 cfh	.018	45	1,510	4,560
	Glass	21	1.13	45	1,050	
Bedroom	Wall	155	.13	45	900	
No. 3	Floor	123	Common			
	Ceiling	123	.15	20	370	
	Inf. 1½ a.c.	1,476 cfh	.018	45	1,200	3,520
	Glass	19	1.13	45	950	
Bedroom	Wall	153	.28	45	1,920	
No. 4	Floor	116	.12	30	420	
	Ceiling	116	.15	20	350	
	Inf. 1½ a.c.	1,392 cfh	.018	45	1,130	4,770
	Glass	10	1.13	45	500	
Bathroom	Wall	34	.13	45	200	
No. 1	Floor	55	Common			
	Ceiling	55	.15	20	170	
	Inf. 1 a.c.	440 cfh	.018	45	360	1,230
	Glass	6	1.13	45	300	
Bathroom	Wall	90	.28	20	500	
No. 2	Floor (garage)	35	.12	30	130	
	Ceiling	35	.15	20	100	
	Inf. 1 a.c.	280 cfh	.018	45	220	1,250
				Total		43,500 Btuh

TABLE 6
Heating Load *Cleveland*

A	B	C	D	E	F	G
Room	Part of Structure or infiltration	Net area sq ft and air volume	Coefficient *U*	Temp. diff.	Heat loss Btuh	Totals Btuh
	Glass	37	.45	70	1,160	
Living	Glass (door)	18	1.13	70	1,420	
Room	Wall	245	.13	70	2,220	
	Wall (garage)	113	.18	30	610	
	Floor	295	.34	20	1,970	
	Ceiling	295	Common			
	Inf. ¾ a.c.	1,930 cfh	.018	70	2,430	9,810
	Glass	26	.45	70	820	
Dining	Wall	206	.13	70	1,870	
Room	Floor	186	.34	20	1,260	
	Ceiling	186	Common			
	Inf. ¾ a.c.	1,187 cfh	.018	70	1,500	5,450
	Glass	20	.45	70	630	
	Door	18	.51	70	650	
Kitchen	Wall	136	.13	70	1,230	
	Wall (garage)	68	.18	30	370	
	Floor (entrance)	9	.10	30	30	
	Floor	157	.34	20	1,070	
	Ceiling	157	Common			
	Inf. ¾ a.c.	1,058 cfh	.018	70	1,330	5,310
	Door	21	.51	70	750	
Entrance	Wall	38	.13	70	340	
Hall	Floor	84	.34	20	570	
	Ceiling	84	Common			
	Inf. 3 a.c.	2,118 cfh	.018	70	2,660	4,320
	Glass	6	.45	70	190	
Lavatory	Wall	147	.13	70	1,330	
	Wall (garage)	51	.18	30	270	
	Floor (ground)	18	.10	30	50	
	Ceiling (attic)	18	.15	35	90	
	Inf. ¾ a.c.	115 cfh	.018	70	150	2,080
	Glass (outside)	10	1.13	40	+ 450	Subtract
	Wall (outside)	298	.18	40	+2,140	gains
	Doors (outside)	52	.51	40	+1,060	from
Garage	Wall (inside)	342	.18	−30	−1,840	losses.
	Door (inside)	18	.51	−30	− 270	
	Floor	200	Common			
	Ceiling	200	.15	−30	− 900	
	Inf. 1½ a.c.	3,600 cfh	.018	40	+2,600	3,240
	Glass	30	.45	70	940	
Bedroom	Wall	322	.13	70	2,920	
No. 1	Floor	242	Common			
	Ceiling	242	.15	35	1,270	
	Inf. ¾ a.c.	1,452 cfh	.018	70	1,830	6,960
	Glass	30	.45	70	940	
Bedroom	Wall	184	.13	70	1,670	
No. 2	Floor	161	Common			
	Ceiling	161	.15	35	850	
	Inf. ¾ a.c.	936 cfh	.018	70	1,180	4,640
	Glass	21	.45	70	660	
Bedroom	Wall	155	.13	70	1,410	
No. 3	Floor	123	Common			
	Ceiling	123	.15	35	650	
	Inf. ¾ a.c.	738 cfh	.018	70	930	3,650
	Glass	19	.45	70	600	
Bedroom	Wall	153	.28	70	3,000	
No. 4	Floor	116	.12	30	420	
	Ceiling	116	.15	35	610	
	Inf. ¾ a.c.	696 cfh	.018	70	870	5,500
	Glass	10	.45	70	310	
Bathroom	Wall	34	.13	70	310	
No. 1	Floor	55	Common			
	Ceiling	55	.15	35	290	
	Inf. ½ a.c.	220 cfh	.018	70	560	1,470
	Glass	6	.45	70	190	
Bathroom	Wall	90	.28	35	880	
No. 2	Floor (garage)	35	.12	30	130	
	Ceiling	35	.15	35	180	
	Inf. ½ a.c.	140 cfh	.018	70	360	1,740
				Total		54,170 Btuh

TABLE 7
Heating Load
Minneapolis

A	B	C	D	E	F	G
Room	Part of Structure or infiltration	Net area sq ft and air volume	Coefficient U	Temp. Diff.	Heat loss Btuh	Totals Btuh
	Glass	37	.45	90	1,550	
Living	Glass (door)	18	1.13	90	1,830	
	Wall	245	.13	90	2,860	
Room	Wall (garage)	113	.18	30	610	
	Floor	295	.34	40	4,000	
	Ceiling	295	Common			
	Inf. ¾ a.c.	1,930 cfh	.018	90	3,120	13,970
	Glass	26	.45	90	1,050	
Dining	Wall	206	.13	90	2,400	
Room	Floor	186	.34	40	2,520	
	Ceiling	186	Common			
	Inf. ¾ a.c.	1,187 cfh	.018	90	1,920	7,890
	Glass	20	.45	90	810	
	Door	18	.51	90	820	
Kitchen	Wall	136	.13	90	1,580	
	Wall (garage)	68	.18	30	370	
	Floor (entrance)	9	.10	30	30	
	Floor	157	.34	40	2,140	
	Ceiling	157	Common			
	Inf. ¾ a.c.	1,058 cfh	.018	90	1,720	7,470
	Door	21	.51	90	960	
Entrance	Wall	38	.13	90	440	
Hall	Floor	84	.34	40	1,140	
	Ceiling	84	Common			
	Inf. 3 a.c	2,118 cfh	.018	90	3,420	5,960
	Glass	6	.45	90	240	
	Wall	147	.13	90	1,710	
Lavatory	Wall (garage)	51	.18	30	270	
	Floor (ground)	18	.10	30	50	
	Ceiling (attic)	18	.15	45	120	
	Inf. ¾ a.c.	115 cfh	.018	90	190	2,580
	Glass (outside)	10	1.13	60	+ 680	Subtract
	Wall (outside)	298	.18	60	+3,200	gains
Garage	Doors (outside)	52	.51	60	+1,590	from
	Wall (inside)	342	.18	−30	−1,840	losses.
	Door (inside)	18	.51	−30	− 270	
	Floor	200	.10	20	+ 400	
	Ceiling	200	.15	−30	− 900	
	Inf. 1½ a.c.	3,600 cfh	.018	60	+3,900	6,760
	Glass	30	.45	90	1,210	
Bedroom	Wall	322	.13	90	3,760	
No. 1	Floor	242	Common			
	Ceiling	242	.15	45	1,630	
	Inf. ¾ a.c.	1,452 cfh	.018	90	2,340	8,940
	Glass	30	.45	90	1,210	
Bedroom	Wall	184	.13	90	2,150	
No. 2	Floor	161	Common			
	Ceiling	161	.15	45	1,080	
	Inf. ¾ a.c.	936 cfh	.018	90	1,510	5,950
	Glass	21	.45	90	850	
Bedroom	Wall	155	.13	90	1,810	
No. 3	Floor	123	Common			
	Ceiling	123	.15	45	830	
	Inf. ¾ a.c.	738 cfh	.018	90	1,200	4,690
	Glass	19	.45	90	770	
Bedroom	Wall	153	.28	90	3,840	
No. 4	Floor	116	.12	30	420	
	Ceiling	116	.15	45	780	
	Inf. ¾ a.c.	696 cfh	.018	90	1,130	6,940
	Glass	10	.45	90	400	
Bathroom	Wall	34	.13	90	400	
No. 1	Floor	55	Common			
	Ceiling	55	.15	45	370	
	Inf. ½ a.c.	220 cfh	.018	90	360	1,530
	Glass	6	.45	90	240	
Bathroom	Wall	90	.28	40	1,010	
No. 2	Floor (garage)	35	.12	30	130	
	Ceiling	34	.15	45	240	
	Inf. ½ a.c.	140 cfh	.018	90	220	1,840
				Total		74,520 Btuh

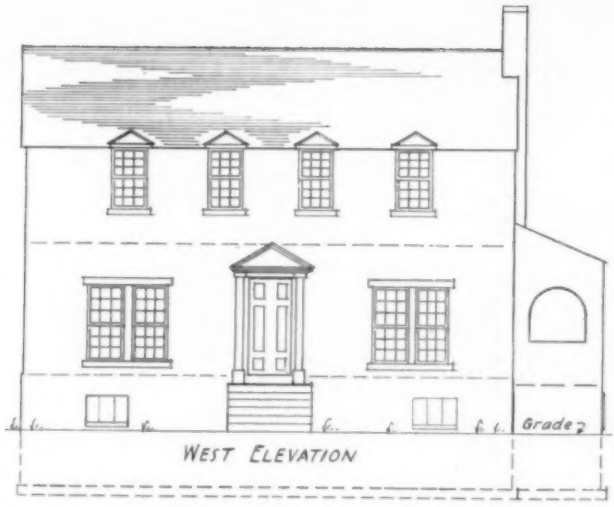


Fig. 1

Fig. 2

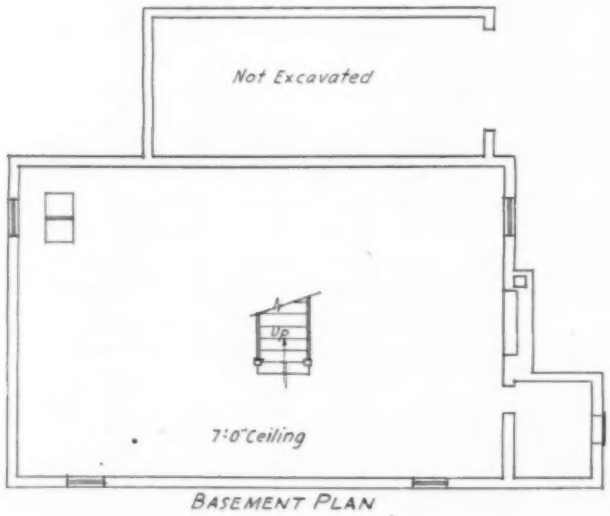
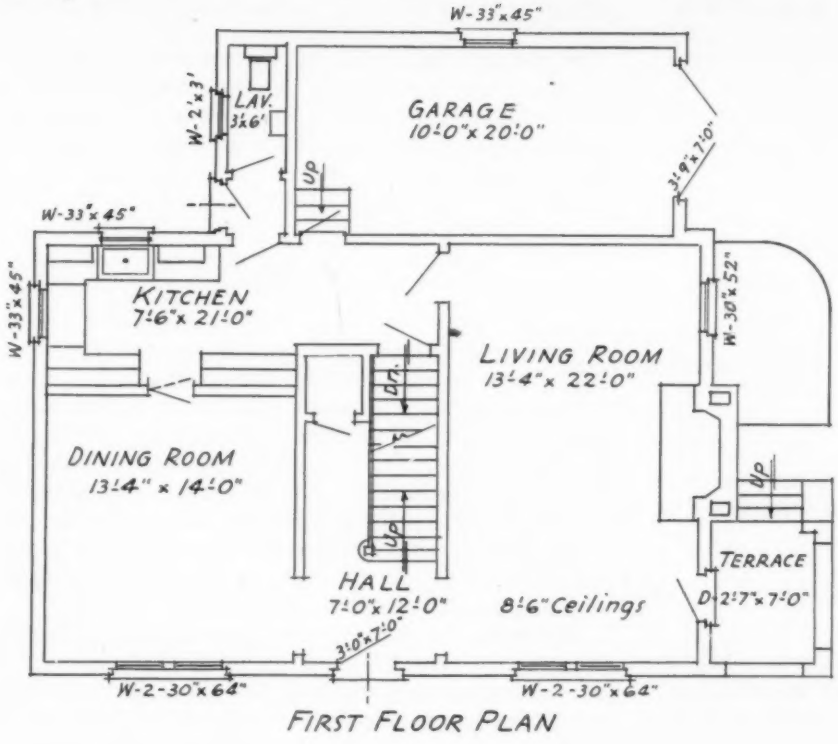


Fig. 3



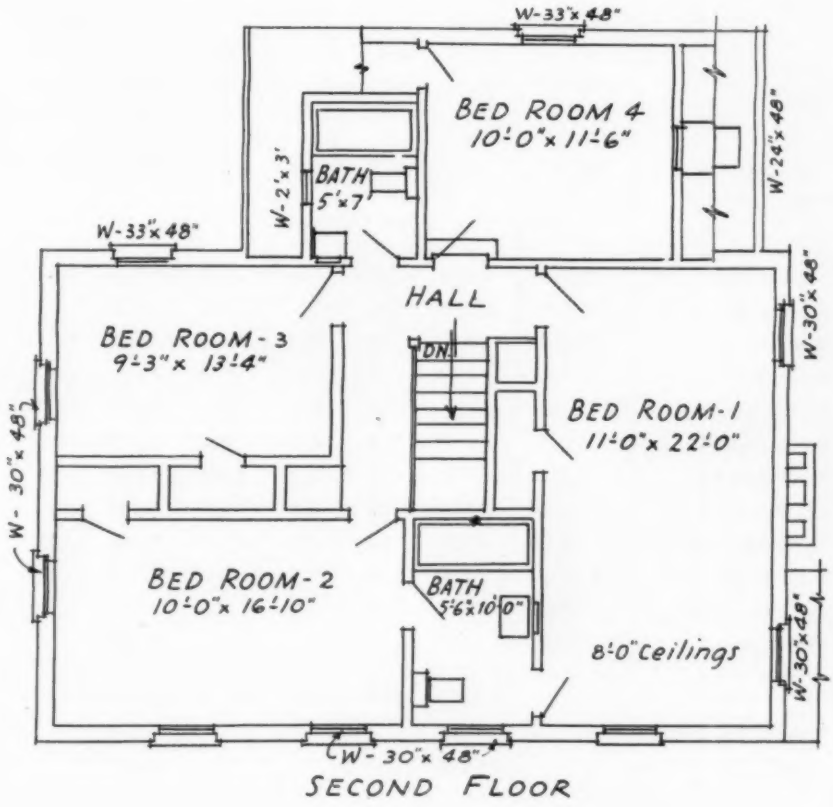
FIRST FLOOR PLAN

Fig. 4 The construction of this house is quite conventional as can be seen in the plan at the left. Rooms are a bit large compared to present-day standards.

nace, directly in the air stream. A relative humidity of 30 per cent is specified by the system requirements already stated. In order to determine the amount of water required to maintain that percentage of humidity it is necessary to know the total heat loss. This is secured by adding the sensible and latent heat losses.

The latent heat loss is calculated as follows, from equation (5):

New Orleans	20,550 x (2.5—1.6) x $\frac{1080}{7000}$	= 2,840 Btu
Cleveland	14,205 x (2.5— .5) x $\frac{1080}{7000}$	= 4,370 Btu
Minneapolis	14,205 x (2.5— .0) x $\frac{1080}{7000}$	= 5,470 Btu



SECOND FLOOR

Fig. 5 A heating problem that will be familiar to many readers is posed by the presence of a bedroom over the attached garage in this house. C-A-C has proven that this problem is not difficult to solve, however.

Amount of water to be sprayed in the humidifier is then determined in this way:

$$\text{New Orleans } \frac{2840}{1080 \times 8.3} = .3 \text{ gph}$$

$$\text{Cleveland } \frac{4370}{1080 \times 8.3} = .5 \text{ gph}$$

$$\text{Minneapolis } \frac{5470}{1080 \times 8.3} = .6 \text{ gph}$$

where: 1080 = latent heat of water vapor per lb of water
8.3 = lb of water in 1 gal

The temperature of entering air has been set at 115 F for New Orleans, 125 F for Cleveland, and 145 F for Minneapolis. These temperatures are based on standard air and 70 F, which is unity. Use this formula:

$$\frac{\text{heat loss Btu per hour}}{1.08 \times (\text{Temp. entering air} - \text{room temp.})} = \text{cfm} \quad (8)$$

For example, the living room in New Orleans has a heat loss of 7,910 Btu per hour. If the entering air temperature is 115 F and the room temperature is 70 F, then:

$$\frac{7910}{1.08 \times (115 - 70)} = 160 \text{ cfm}$$

The air volume for each room for each city has been calculated using this formula.

In this particular example, the amount of air entering the living room is 160 cfm at 115 F, according to the formula. But, the air volume actually entering the room will be more than 160 cfm, since air becomes lighter as it is heated, and at 115 F its density is .922. So, the air volume in the living room is:

$$\frac{7910}{1.08 \times .922 \times (115 - 70)} = 177 \text{ cfm}$$

In all cases the actual cfm per room will be higher, depending on the temperature rise above 70 F.

It is good practice to calculate air quantities on the basis of standard air, because the result will also represent blower cfm, since blower capacity is based on standard air delivery. The difference is very slight in most cases and it would only be a disturbing factor to introduce the matter of density. It must be kept in mind however, that although the density factor is disregarded, more air will enter a room than indicated for standard air temperatures.

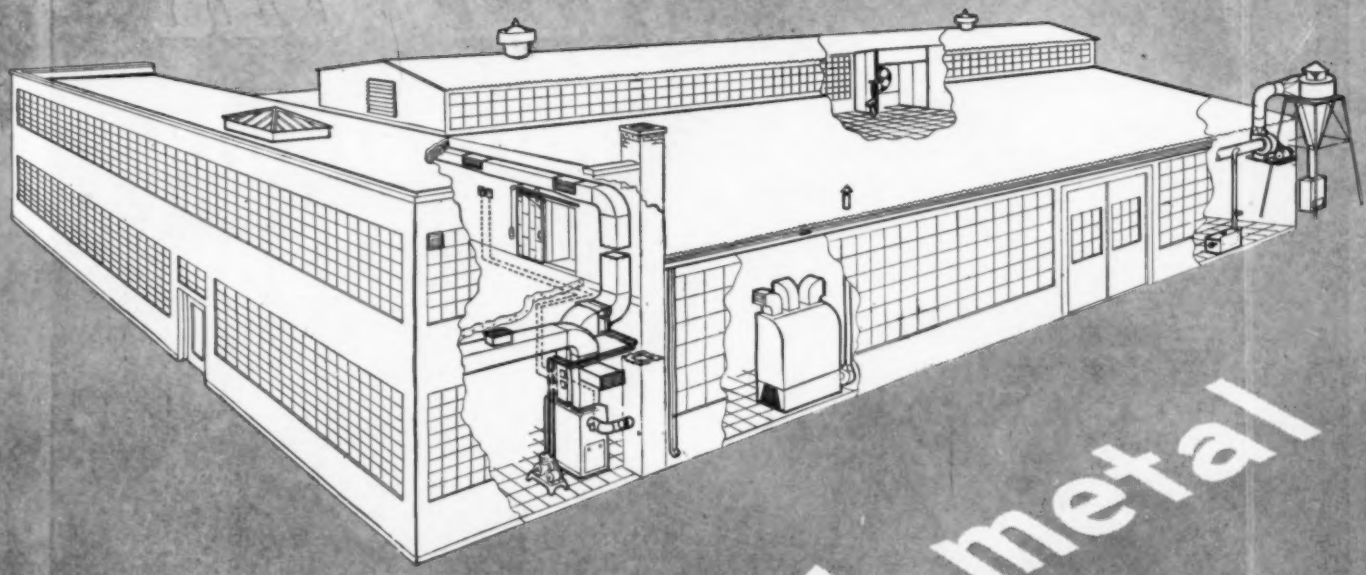
The same principle applies when using air lower in temperature than 70 F to design a cooling system. The air volume entering the room will actually be less than calculated using standard air. Again, the variation is slight because air is usually delivered to the room at 60 to 65 F. For the sake of consistency all cfm figures shown are based on standard air.

(Please turn to page 168)

TABLE 8

Comparison of heat losses and infiltration, amount of air required and air changes.

Room	Volume of rooms cu ft	Total heat loss per room Btu	Cfm ent. room based on 115 F	Air chgs. per hour	Inf. per hour cfh	Total heat loss per room Btu	Cfm ent. room based on 125 F	Air chgs. per hour	Inf. per hour cfh	Total heat loss per room Btu	Cfm ent. room based on 145 F	Air chgs. per hour	Inf. per hour cfh
		New Orleans				Cleveland				Minneapolis			
Living room	2,910	7,910	160	3.3	3,860	9,910	167	3.5	1,930	13,970	172	3.6	1,930
Dining room	1,580	5,220	107	4.1	2,373	5,450	92	3.5	1,187	7,890	97	3.7	1,187
Kitchen	1,410	4,320	89	3.8	2,115	5,310	90	3.9	1,058	7,470	92	3.4	1,058
Entrance hall	700	2,420	50	4.3	2,118	4,320	73	6.3	2,118	5,960	74	6.4	2,118
Lavatory	150	1,720	35	14.0	1,720	2,080	35	15.2	130	2,580	32	12.8	130
Bedroom #1	1,940	6,450	133	4.1	2,904	6,960	117	3.6	1,452	8,940	110	3.5	1,452
Bedroom #2	1,250	4,560	94	4.5	1,872	4,640	78	3.8	936	5,950	74	3.6	936
Bedroom #3	980	3,520	73	4.5	1,476	3,600	61	3.8	738	4,690	58	3.6	738
Bedroom #4	930	4,770	98	6.3	1,392	5,500	93	6.0	696	6,940	86	5.6	696
Bathroom #1	440	1,230	25	3.4	440	1,190	20	3.4	220	1,530	19	2.6	220
Bathroom #2	280	1,250	25	10.7	280	1,560	26	13.0	140	1,840	23	5.0	140
Garage	2,400					3,240	55	1.4	3,600	6,760	83	2.1	3,600
		43,500	889	4.3	20,550	54,170	907	3.7	14,205	74,520	920	3.7	14,205
Latent heat loss	14,970	2,840				4,370				5,470			
Total		46,340				58,540				79,990			



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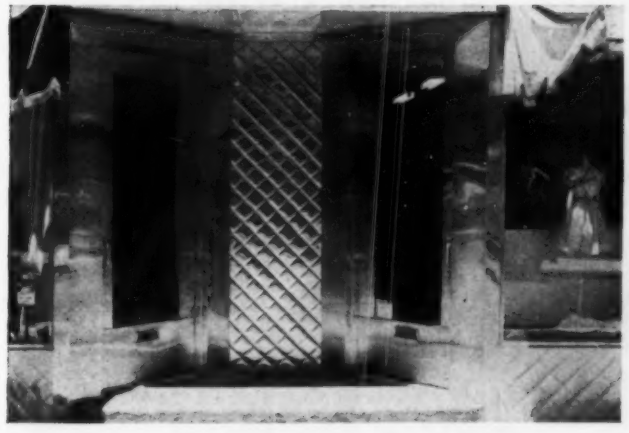
Stainless steel letters set in

Center seam hidden by a triangle

Stainless Steel Fronts

Lawrence E. Gichner
Washington, D. C.

Atlantic City is founded upon and depends on the tourist trade. The merchants in town have to lure those tourists into their stores and stainless steel fronts have proven the most effective way of bringing the buyer into the shop.



An effective vestibule treatment

STAINLESS steel is adding a fascinating glitter to the city of sunshine and sand. No community in our country is as stainless steel conscious as "The Playground of America," Atlantic City. On a per capita basis it is head and shoulders above any town in the land in its lavish use of the white metal.

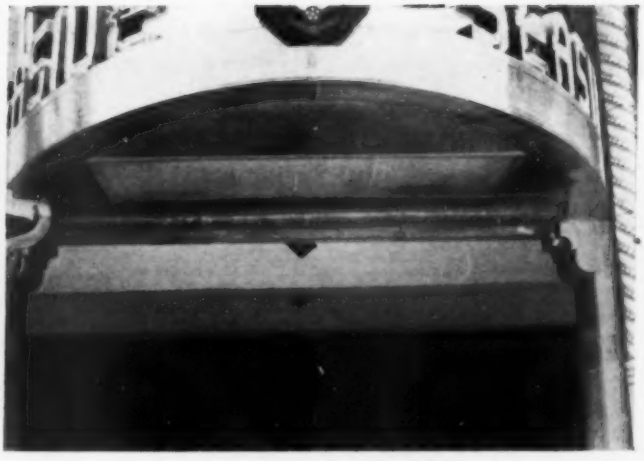
Whether the display is of glistening hot dogs, sparkling diamonds, chic dresses, lavish furs, freshly made candy or age-worn antiques, the smooth sheen of stainless steel gives each and all an additional appeal, helps catch the eye of the passerby and makes the merchandise displayed more readily acceptable.

Coffee shops, bars and restaurants have found that stainless steel shaped into doors and exterior trim gives their establishment an aura that is inviting and pleasing.

Hotels are finding that a marquise gives a dignified

Stainless steel cornice and letters

An attractive corner treatment



Under view shows light panel

Drive cleat gives poor appearance

Letter covers center seam

Wall canopy and sign of stainless steel

and rich tone to their entrances and a luxurious air of welcome.

The designers are proving convincingly they have learned the cardinal principles of handling the metal to its best advantage and they are applying these principles.

Too light a gauge, when formed on the brake crinkles along the bent edge and results in a tinny, unsightly appearance. To avoid this effect, which for a time was seriously threatening the use of stainless steel among architects, heavier gauges are being applied which completely eliminate the foregoing objections.

The rich tonal quality of stainless steel shows to best advantage on a round or curved surface. That this is apparent is illustrated in the increased use of designs where the oval is used wherever possible.

Thoroughly displeasing to the eye are dents, mars, stains and streaks which are easily and quickly detected in flat surfaces and the larger the surface, the more glaringly apparent the distracting blemish. To avoid such disfiguration, the trend is towards breaking up such areas in checker board, sunburst and corrugated designs. On show window bases such treatment is particularly desirable.

Rain and water streaks show up readily, but here a simple cleaning, to which stainless steel easily lends itself is all that is necessary. Some merchants clean the metal weekly, some every three weeks, others monthly but some apparently not at all.

The metal has been used to good advantage to lighten darkened entrances and vestibules, making the entry-way inviting rather than forbidding. Narrow stores have been made to look wider with strategic use of stainless steel in a straight wide border across the top of a show window, giving a feeling of length where length was needed.

Use of iron nails and screws, which rust and streak, has been noticed in a number of instances.

The method of soldering joints is practically obsolete. In every observed instance, joints were either butted or lapped with screws unobtrusively placed to hold the material taut. The number of screws used was at a minimum. In some cases where metal was joined by drive cleats, from the point of appearance, the results were unsatisfactory. On a number of marquises the single joint on the face was made un-

Left, A well-curved canopy
Above, A popular type of sign

Left, A modernizing canopy
Above, Braking gives rich results

noticeable by placing a design or letter over the area. In the case of hotels the first letter of the name was used. Putting an ample application of caulking compound under joints and seams is standard practice.

Proper panelling on the ceiling of the canopy can do much to enhance its beauty. Where lights are used, the trend is away from exposed fluorescent and toward diffused illumination through frosted glass. In the larger marquises, square glass panes are distributed in panels over the surface. This type of lighted panel gives an airy feeling and smart dash to the projection.

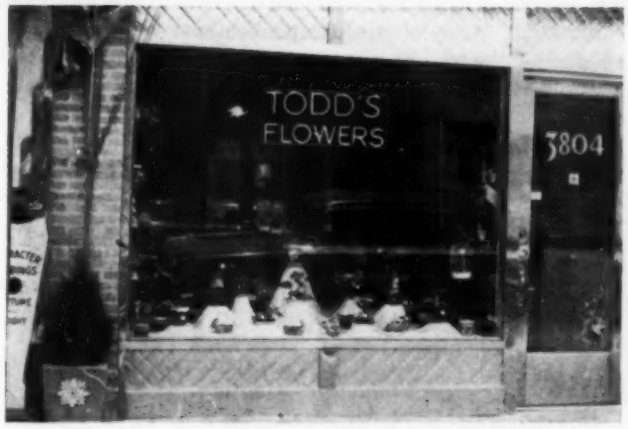
Varying Design Techniques

The face of a marquise has been treated in four different ways with varying results in design. These techniques are: 1) The metal is left plain and straight; 2) Stainless steel bands 1¼ by 1¼ in. are screwed to the flat surface; 3) The metal is raised by running it through the beader; 4) It is broken on the brake.

Of all these methods it is the writer's opinion the third shows the least character, for the raised half circle is too small proportionately to be effective.

Where the 1¼ by 1¼ in. band is used, at night especially, the areas where the metal is attached with screws are noticeable, attention being drawn by reflections of the slightly drawn metal at these joints.

Every person in business who has a store is a potential purchaser of stainless steel. Each is interested in attracting and doing business. Stainless steel is the modern metal that catches attention and gives dignity.



Diamond braking is attractive

Steel unifies this front

Correct Design of Welding Exhaust Ventilation Systems

E. E. HERBACEK
Spencer Air Conditioning Company
Minneapolis, Minnesota

Industry has come more and more to depend upon welding as a fabrication process, and the need for efficient exhaust of welding fumes exists with every installation. The author analyzes the various types of exhaust applications and shows actual designs as illustrations of each type.

REMARKABLE advances have been made in the design and methods for use of electric arc welding equipment. Many of these improvements were perfected during the recent war, at which time almost every war plant had welding installations to speed up production.

These installations varied in size from small departmental systems to large scale installations, comprising an entire building for welding operations.

The large scale welding operations were usually found in plants producing heavy ordnance equipment, and these operations required, in some instances, buildings as large as 240,000 sq ft in area and 40 ft in height.

A Problem of Heating

Heating and ventilating a building of such proportions presented a difficult problem, particularly with respect to welding specification requirements of 80 F, ambient air temperature at the welding operations, with air movement not exceeding 50 fpm.

All arc welding operations require ventilation to remove the gases, smoke and dust particles liberated by the oxidization and fusion of the metals.

Three types of exhaust ventilation systems are applicable to welding installations. These are the high, medium and low pressure type.

1. The high pressure type is best adjusted to irregular or varied welding operations, which cannot easily be enclosed within booth areas.
2. The medium pressure system is suited to regular production welding of small objects which can be enclosed within booth areas.
3. The low pressure system is applicable to the extensive welding operation of large objects for which it is not possible to use either of the first two types of systems. Usually this necessitates the ventilation of entire building areas to remove smoke.

A prime factor for consideration in system design, conducive to good practice of any exhaust ventilation system, is removal of the objectionable fumes, smoke, or dust at the source, and provision of a means for supplying clean, tempered air within the breathing areas of the operators.

Selection of the design, or type of system for welding installations is usually determined by the extent of the installation, the particular welding process, and economy of operation.

In most cases it is desirable, from a standpoint of installation cost and economy of operation, to provide a high pressure type exhaust system.

Nature of High Pressure System

With the high pressure type system, a lesser volume of air is handled, but at higher suction pressure, and, consequently, smaller ducts and exhaust fan equipment can be used which require less installation space.

In the design of high pressure systems, suction nozzles are attached to 10 to 12 ft lengths of 3 in. dia electro-galvanized, flexible metal tubing. These nozzles have an orifice of 18 in., and a suction of 2½ in. water gage is maintained at the nozzle connection.

Under these conditions, based on an air temperature of 65 F, and an orifice coefficient of .71 with 10 per cent added for leakage, each nozzle will exhaust 243 cfm from the welding area, or station.

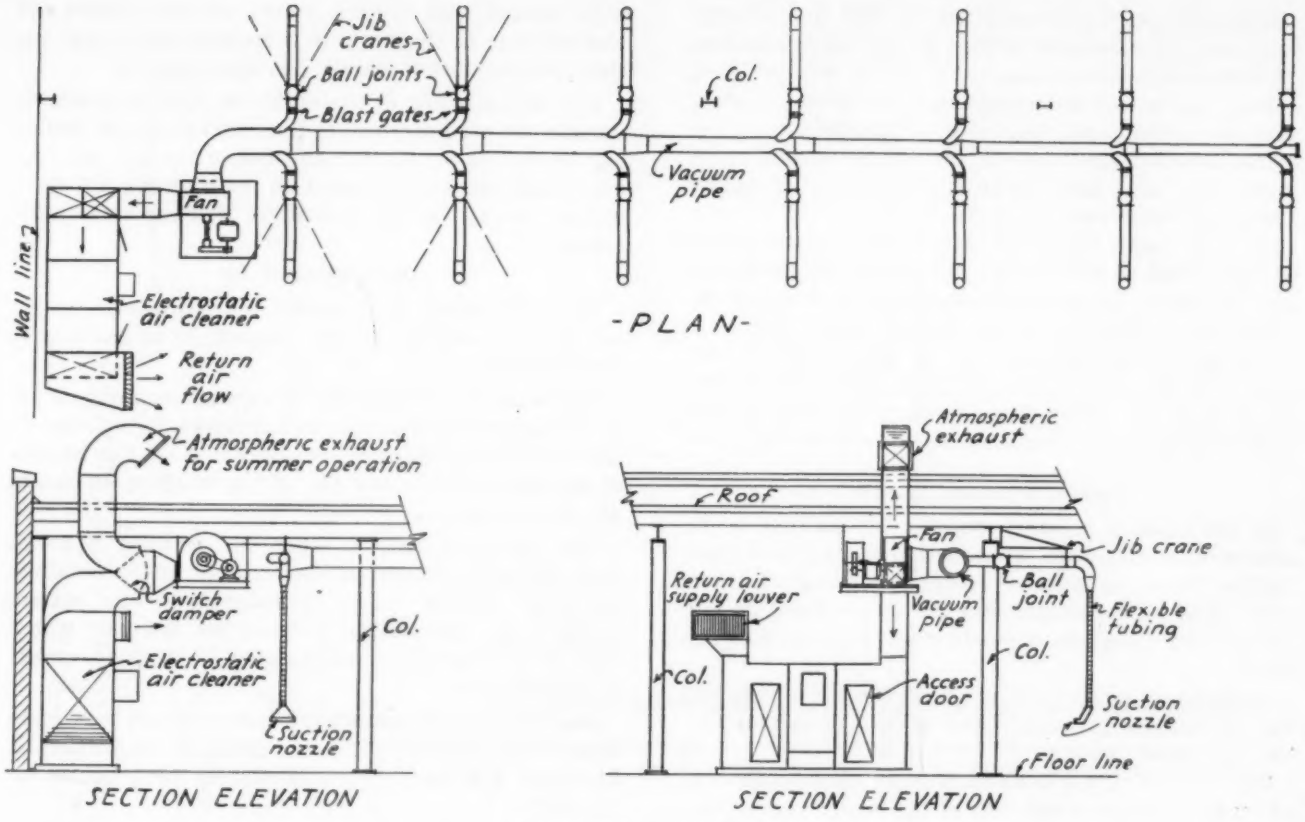


Fig. 1 High pressure system

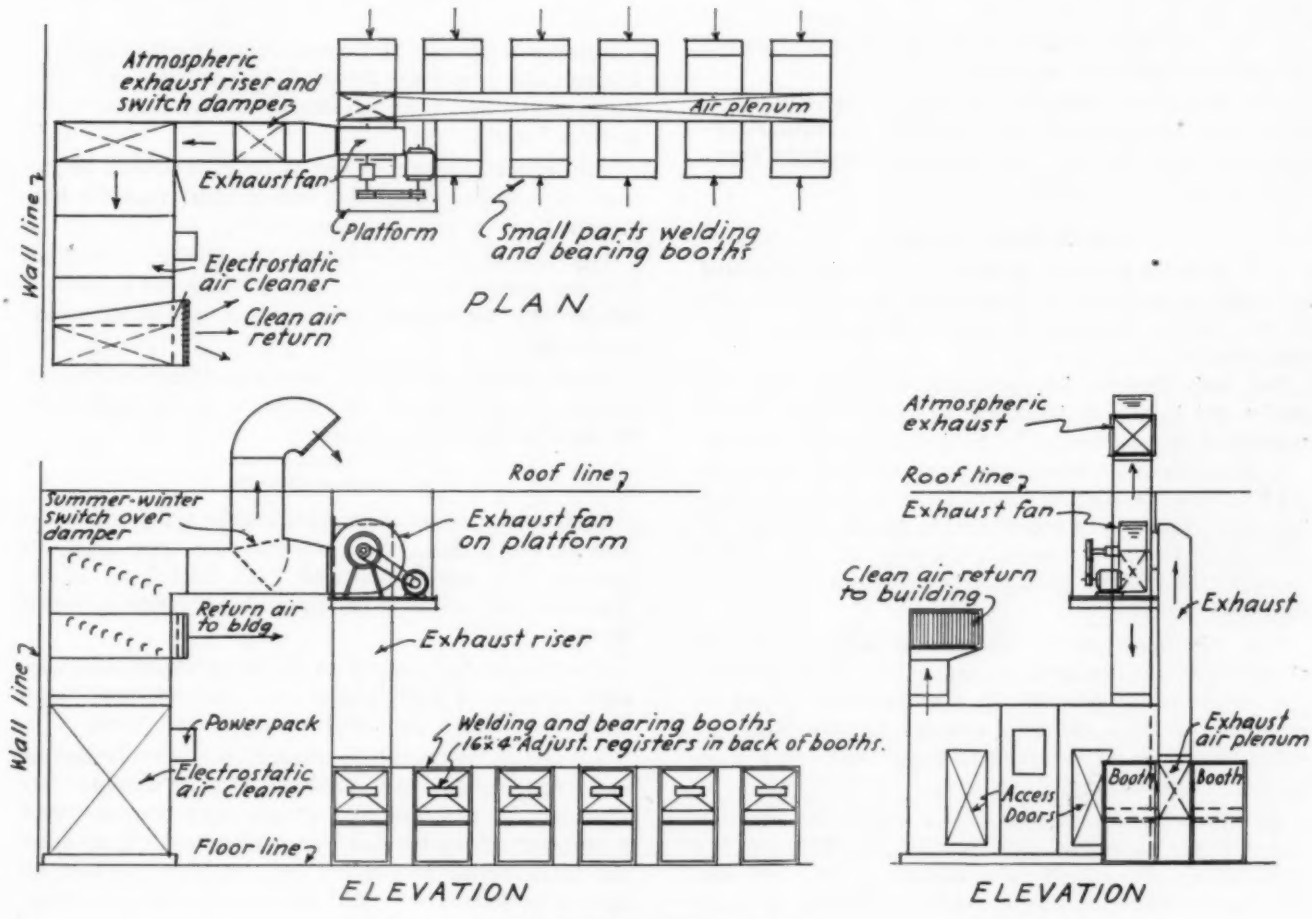


Fig. 2 Medium pressure system

Branches and mains are sized for 2500 fpm velocity to maintain a movement of dust within the system and prevent drift.

The branch suction connections should be designed with ball joints and jib crane, to provide an arc required to cover the limits of the entire welding operation area, and allow flexibility and ease of nozzle movement, with respect to the work.

In many cases this joint and crane equipment can be eliminated where welding operations are limited to smaller areas, and maximum distance movement of the nozzle can be handled by the flexible metal hose.

The fan equipment used for the high pressure system is of the steel plate, mill type exhauster design. These units are either direct connected or belt driven, with normally high operating pressure characteristics.

Medium Pressure System

In the medium pressure systems, for multiple booth enclosures, used for small production welding and brazing operations, exhaust air openings are located in the rear panel of the booth, and are either fixed or adjustable for elevation, depending on the nature of the work.

A relatively larger volume of exhaust air is required in the medium pressure booth system of ventilation, but at a lower pressure.

The volume of air exhausted from each booth will, of course, depend on the size of the booth, and is usually based on maintaining a velocity of 150 to 200 fpm over the breathing zone area at the booth opening.

For the smaller booth installation, this amounts to 500 to 750 cfm per booth. The exhaust openings are sized for 1,500 fpm velocity, with branches and mains at 1,800 and 2,000 fpm velocity.

Fan equipment used for this type of installation is either the backward curved limit load, or regular forward curved blade type, having normal medium operating pressure characteristics.

Low Pressure System

Low pressure exhaust systems are usually installed for either large booth or room areas, where the nature of the work or installation make it impossible to provide exhaust at the source.

For such systems, low pressure, propellor type fan equipment is usually installed, and the volume of air exhausted based on velocity, or the air change method.

In any exhaust system design, an analysis should be made of the installation costs compared to the operating costs, and where possible, this should include the value of providing a means of recovery of heat wasted through the system, particularly in industries located in colder climates.

The advancement in design and manufacture of electrostatic air cleaning equipment has made possible the reduction of exceedingly high operating costs of extensive welding exhaust systems, by providing an effective means for recovery of waste heat, when used in connection with such systems.

In the application of electrostatic equipment for such installations, selection of the unit should be on the basis of an air velocity not exceeding 150 fpm, depending on how closely the welding operation is hooded, and the concentration of dust. In the case of the high suction type system, where suction nozzles are located close to the work, it is recommended that the electrostatic cleaner handle 125 fpm velocity.

It is also possible in the design of such a system to include the necessary coil equipment to heat the building, as well as ventilation and heat recovery. Air volume requirements are based on maintaining a 6 minute air change in the immediate welding areas indicated.

Distribution of Air

Air distribution is by means of longitudinal slotted adjustable openings in the low side wing portion of the building.

Ductwork for distribution of exhaust and supply air is eliminated in this particular design of system, by the installation of steel sheet decking on the bottom of the beams in the low bay of the building, to obtain air plenum spaces.

The air is exhausted from the building through openings near the roof of the high bay of the building. Make-up outdoor air is introduced to the system through an automatically-controlled damper, which maintains a static pressure balance to eliminate excessive infiltration.

Due to traveling crane equipment, usually present in these large buildings, it is necessary to locate the air handling and recovery equipment in pent houses on the roof.

Multiple unit installations as indicated, are required to provide a better distribution for the exhaust air, and to restrict the size of equipment within reasonable limits.

Automatic temperature control equipment is required to maintain proper air delivery temperatures for heating and ventilating requirements of the building and process control.

The equipment pent house enclosures should be insulated to prevent excessive loss of heat from the mechanical equipment surfaces.

The typical indicated system design for a building the size described, requires the handling of a total of 600,000 cfm, circulated within the concentrated welding areas.

These conditions require the installation of twenty unit systems of 30,000 cfm capacity each. Each unit serves five bays of the building.

Equipment Details

Each unit consists of an electrostatic type air cleaner and recovery unit, steam distributing type blast air heating coils, and centrifugal limit load type, double width fan driven by a 7½ hp motor through a V-belt drive.

The equipment is enclosed in heavy gauge steel casings reinforced with angle iron and equipped with wash down drain pans and service access doors.

Automatic dampers are located in the recirculating and fresh outdoor air openings. These dampers are sized for 100 per cent air capacity, and provided with a manual automatic rheostat control switch, to allow the introduction of 100 per cent of fresh outdoor air during periods when outdoor temperature conditions permit.

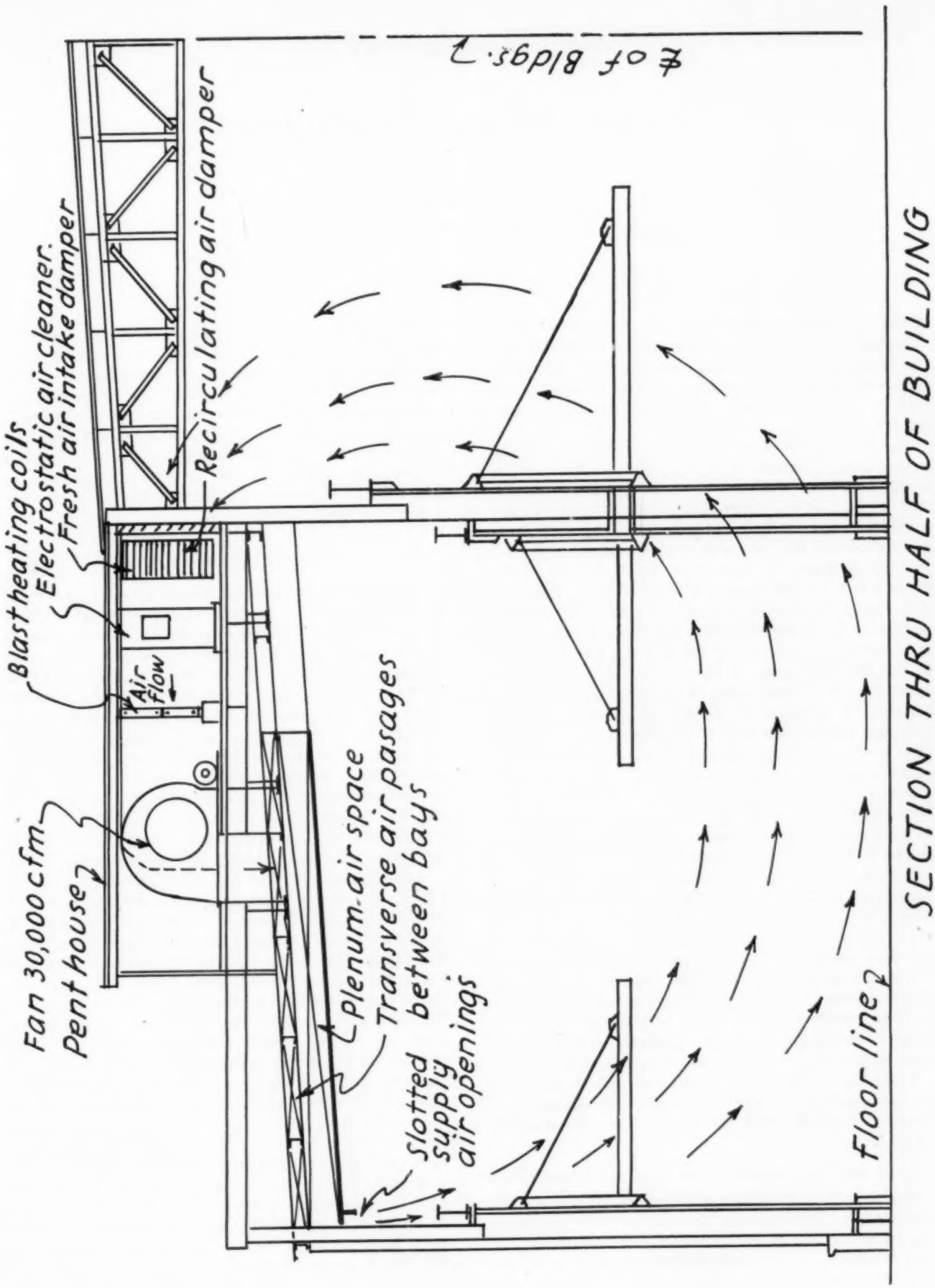


Fig. 3 Low pressure system

Pattern Development For

Three Way Branches

WILLIAM NEUBECKER
Brooklyn, New York

THE full page drawing shows the method of developing three way branches, regardless of dimensions. The branches are to be fabricated from 16 gauge steel, butt welded. Since 16 gauge metal is approximately 1/16 in. thick, the neutral diameter need not be considered.

The first step is to set off the desired height of the center branch, shown by *1-A* in the elevation. Then, using *A* as center with *1-A* as radius, draw the arc *B-C*. From *A* at the desired angle (in this case 45 deg) draw this angle on both sides as shown by *A-3*, intersecting the arc *B-C* at *3* and *3*. Now space this arc *3-3* in four divisions, as shown by *1-2-3* on both sides. From *2* and *2* draw lines to *A*. Now at right angles to *A-1* and *A-3* through *1*, *3* and *3*, draw the desired diameters as shown. Establish the desired distance of the joint lines as shown by *A-E* and draw lines from *E* to the diameter lines of the outlets. Now draw lines from *M* to *N* on both sides to complete the elevation. To avoid a confusion of lines in so small a drawing, the right branch has been reproduced in Fig. 1. Using *h* as center, draw the semi-circle *1-7* and divide it in equal segments. From the divisions *2* to *6*, at right angles to *1-7*, draw lines to intersect *1-7* from *f* to *j*. Now using *D* in Fig. 1 as center draw the quadrant *8* to *11* and space it in the same number of divisions as shown in the quadrant, in the semi-circle, on the line *1-7* from *8* to *11*. It now becomes necessary to draw a section on the line *D-15* in Fig. 1 as follows: At right angles to *D-15* draw the line *D-12*, equal to *D-11* and draw the semi-elliptical figure *12-15*, and divide it in the same number of divisions as in the quadrant *D-8-11*, as shown in the semi-ellipse from *12* to *15*. From the divisions *13* and *14* draw lines at right angles to *D-15* to intersect this line at *a* and *b*. Also, from the intersections *9* and *10*, in the quadrant, draw lines at right angles to *D-8* to intersect this line at *d* and *e*.

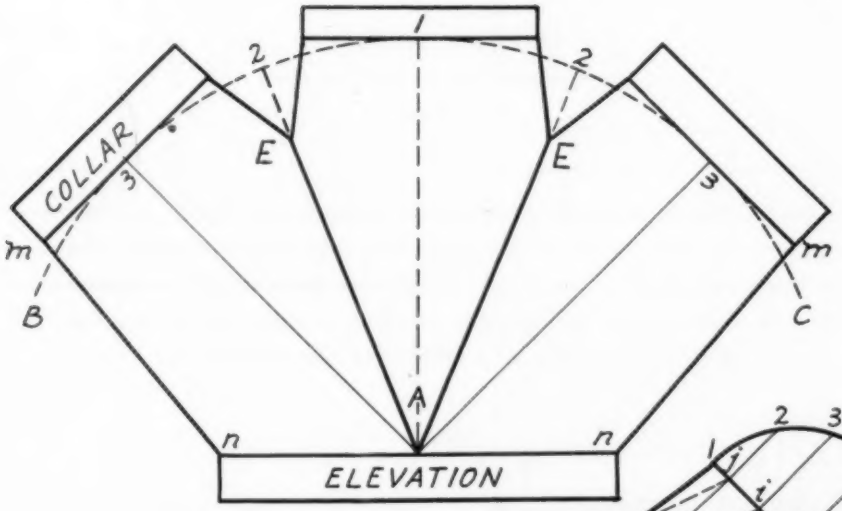
From the various intersections obtained on the lines *1-7*, *8-D*, and *D-15*, draw the solid and dotted lines shown, always drawing the dotted lines the shortest way across.

Finding the True Lengths of the Solid and Dotted Lines

Fig. 2 and 3 show the diagrams of the solid and dotted lines. For example: to find the true length of the solid line *D-h* in Fig. 1, set off this distance on the line *D-h* in Fig. 2. At right angles to the line erect the lines *D-11* and *h-4* equal respectively to *D-11* and *h-4* in Fig. 1. Draw a line from *4* to *11* in Fig. 2 which is the desired true length. In this manner the balance of the solid true lengths are obtained. In a similar manner obtain the true lengths of the dotted lines. For example: To find the true length of the dotted line *d-h* in Fig. 1, place this distance on the line *d-i* in Fig. 3 as shown from *d* to *h*. At right angles to *d-h* draw the lines *d-10* and *h-4*, equal respectively to *d-10* and *h-4* in Fig. 1. Draw a line in Fig. 3 from *4* to *10* the desired true length. Proceed in this manner for the balance of the dotted true lengths.

Developing the Various Patterns

In developing the pattern shapes measurements will be taken from Fig. 1, 2, and 3 and transferred to Fig. 4 as follows: First take the length of the line *7-8* in Fig. 1, which shows its true length and place it as shown by *7-8* in Fig. 4. Now with *7-6* in the semi-circle in Fig. 1 as radius and *7* in Fig. 4 as center, draw the short arc *6* and intersect it by an arc struck from *8* as center with a radius equal to the dotted true length *8-6* in Fig. 3. Now take the distance *8-9* in the quadrant in Fig. 1 as radius and *8* in Fig. 4 as center, draw a short arc near *9* and intersect this arc by using *6* in Fig. 4 as center with a radius equal to *6-9* in the solid true lengths in Fig. 2. Proceed in this manner using as radii first the proper division in the semi-circle in Fig. 1, then the proper true length of the dotted line in Fig. 3, the proper division in the quadrant in Fig. 1, then the proper true length of the solid line in Fig. 2, until the line *4-11* in Fig. 4 has been drawn. Now using the proper numbered division in the semi-ellipse in Fig. 1, the proper true length of the dotted line in Fig. 3, the proper numbered divisions in the semi-circle in Fig. 1 and the proper numbered true length of the solid line in Fig. 2 until the dotted line *2-15* in the pattern in Fig. 4 has been drawn. Then using *2-1* in the semi-circle in Fig. 1 as radius and *2* in Fig. 4 as center draw a short arc near *1* and intersect it with an arc struck from *15* in Fig. 4 as center with a radius equal to *15-1* in Fig. 1 (its true length). Through points of intersection so obtained trace the outline of the pattern in Fig. 4. Then *1-7-8-11-15* will be the half pattern for the two end branches. Now take a tracing of *1-4-11-15* in Fig. 4 and place it at the right as shown by *1°-4°-11°-15°* and reverse this outline opposite the line *4°-11°* as shown by similar numbers. Then *1°-1°-15°-11°-15°* will be the half pattern for the center branch. All patterns shown are net.



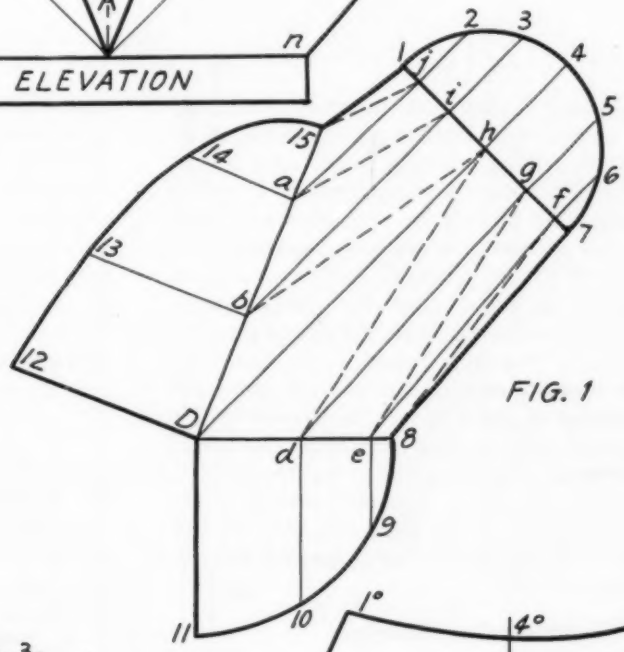


FIG. 1

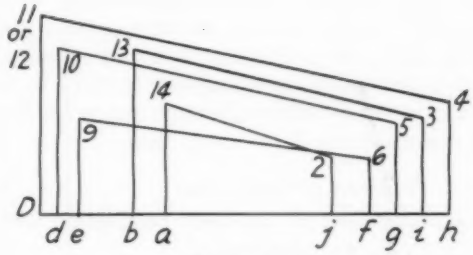


FIG. 2

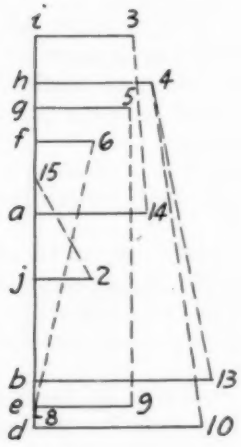
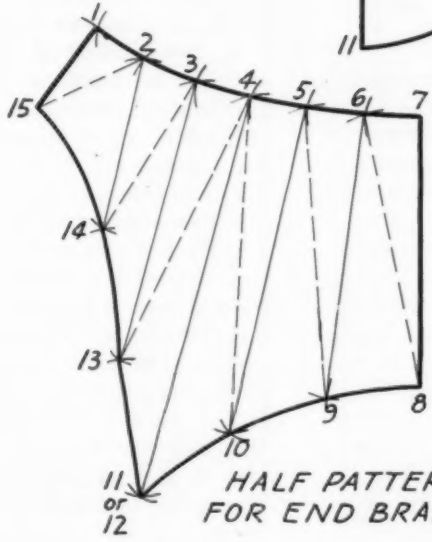


FIG. 3



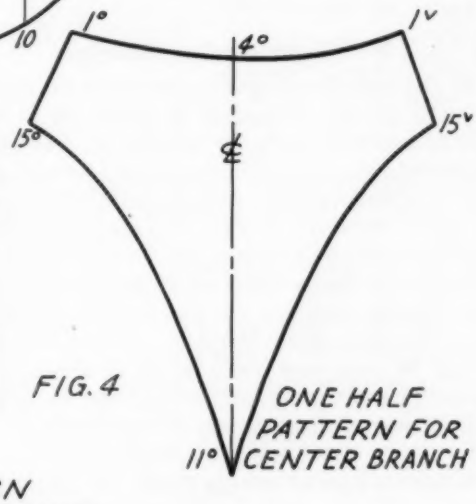


FIG. 4

Pattern For Three Way Branches

– Wm. Neubecker

Scientific Shop Layout (XII)

ERNEST E. ZIDECK
Sheet Metal Consulting Engineer

The twelfth of a series designed to present the latest in shop layouts and techniques for efficient production to our readers. The author's experience in sheet metal design and production has enabled him to show step-by-step the way in which a sheet metal shop can be made to operate most effectively and economically.

SHEET metal work in shipyards includes practically all known sheet metal techniques, since the modern naval craft is a huge building requiring a multiplicity of construction items and equipment. Products of this industry used include air conditioning, light metal doors and windows, machinery housings and guards, ventilation, fume exhausts, office and mess hall utensils and a variety of specialties in all metals. Aluminum is increasing in popularity, replacing heavier brass and copper. The ship, besides being a building housing many men, is also a complicated industrial plant. The number of sheet metal items used in this connection is enormous, ranging from machine hoods, tubing manifolds and heating plant requirements to small instrument accessories too diverse to mention. All of this equipment must be made to order, because it must fit into a certain space and be located to serve a particular need.

Single Worker Technique

In the construction of naval craft individualization of work in the production of sheet metal accessories was formerly the rule. All production was according to blueprints but the individual mechanic was given a job and expected to follow it through all the manufacturing steps himself. This method was originally adopted because there was no possibility of mass-producing the sheet metal items which were to be used in the ship. The obvious result in the shop however was confusion. This was caused by the fact that several mechanics would be searching for a piece of sheet stock at the same time or several would be lined up at a shear or roll former waiting their chance to perform an operation on the job they were handling. There was also considerable backtracking since the man would find a piece of stock, shear it to approximate dimensions, take it back to his bench to lay it out and then return to the shear and process it through the machines as needed.

The answer to this problem was not a matter of adding more machines to the shop, since that would reduce the actual working area. Enlarging the shop would only make it necessary to travel farther in the processing of equipment.

When this country entered World War II it became necessary to expand ship production to a volume never believed possible. A major complication in this problem was the fact that well-trained mechanics were scarce at the start of the war and became scarcer due to the demands of the armed forces. It became obvious that the former production methods would have to be abandoned and a basic rearrangement made in the operation of the shipyard sheet metal shop.

Problems of Production

Engineers working toward increased production were faced with the following problems:

1. All work in the sheet metal shop required the use of blueprints and product drawings. With the growing shortage of competent layout men, the development of adequate drawings was the first problem.
2. The method of having a worker follow his job through all steps of production was outmoded. The shortage of trained help made the next problem the simplification of manufacture and reducing the need for experienced men to a minimum.
3. Confusion at the storeroom was a problem which was easily solved by the institution of a requisitioning system, properly administered.
4. In order to secure greater efficiency in the shipyard it became desirable to plan on having some of the equipment made outside the yard. Subcontracting this work proved to be simple since many sheet metal shops were clamoring for war work.

The third problem, which seemed to be the easiest, was attacked first and the store room *2-A* was established and placed under dependable management. This department then received incoming materials and controlled them, issuing materials on requisitions to the workers. But it was then observed that this would not solve the problem entirely but would only transfer its effects to the store room attendant. The need for having the worker select and trim a single blank had to be eliminated.

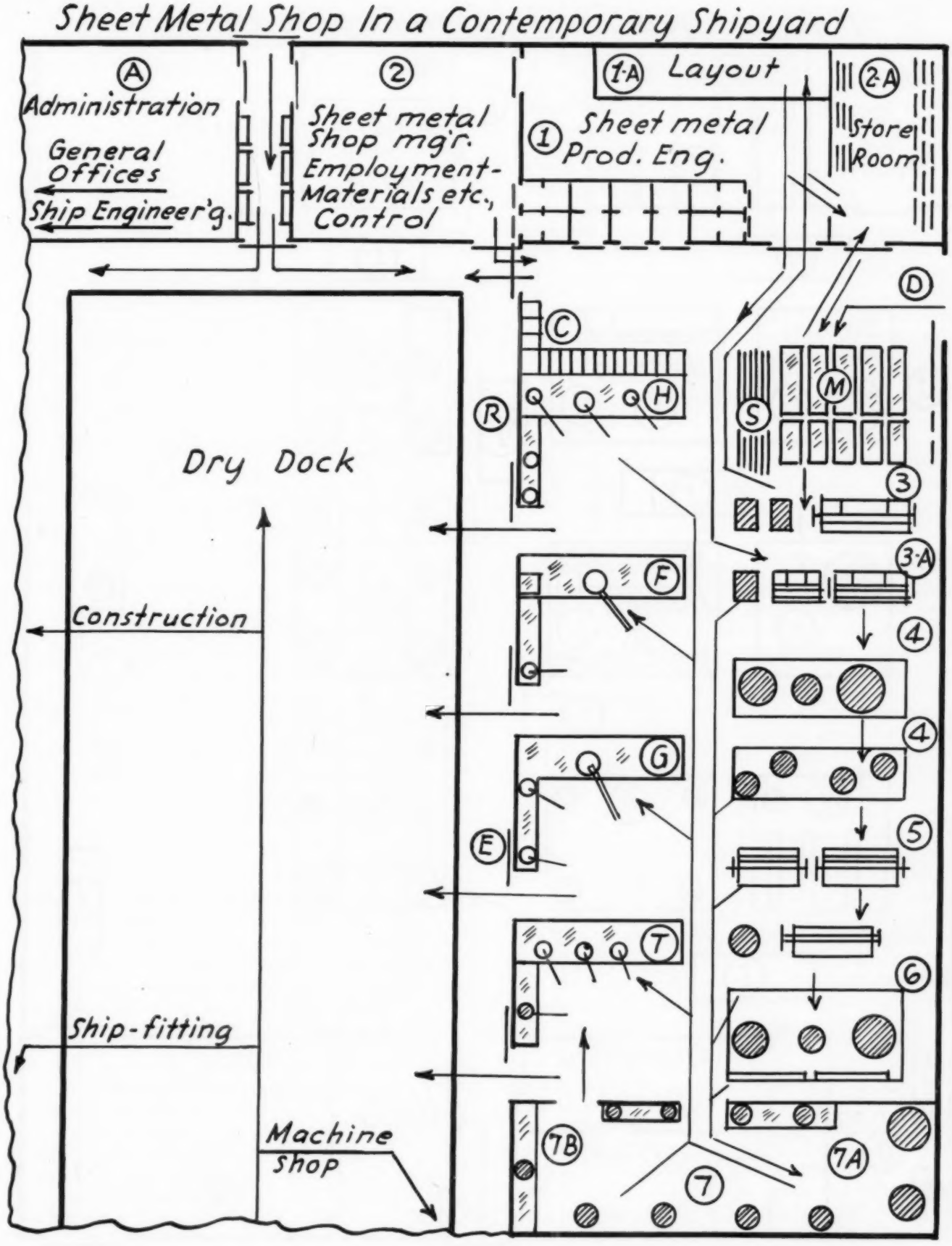

Sheet Metal Shop In a Contemporary Shipyard
A
Administration
General Offices
Ship Engineer'g.
2
Sheet metal Shop mg'r. Employment- Materials etc., Control
1-A
Layout
1
Sheet metal Prod. Eng.
2-A
Store Room
D
C
H
R
S
M
3
3-A
F
4
4
G
E
5
T
6
Dry Dock
Construction
Ship-fitting
Machine Shop
7B
7A
7

Fig. 1

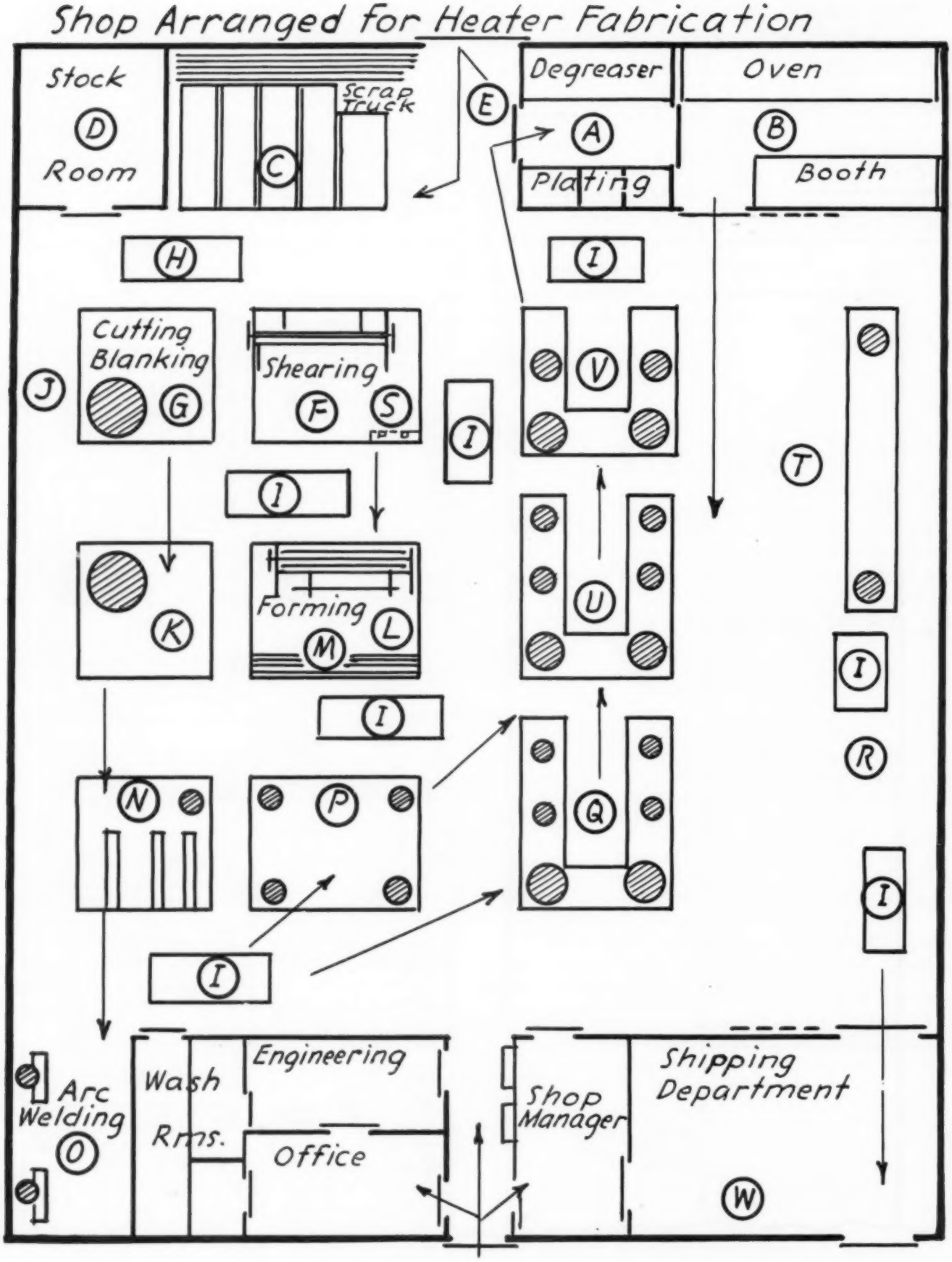

Shop Arranged for Heater Fabrication
Stock
D
Room
Scrap Truck
C
E
Degreaser
A
Plating
Oven
B
Booth
H
I
Cutting
Blanking
J
G
Shearing
F
S
I
V
T
I
I
K
Forming
M
L
U
I
I
R
N
P
Q
I
I
Arc
Welding
O
Wash
Rms.
Engineering
Office
Shop
Manager
Shipping
Department
W

Fig. 2

The solution of this problem was found in the following procedure:

1. The engineering department compiled a list of blanks which would be needed for each day's operation and listed their rough blanked size.

2. The head of the store room was given the list of rough blanks and men under his supervision turned out the requirements at the shears at *3*.

The further problem of layout was handled by having the store keeper sort all blanks according to job number and turn them over to a special layout department under the direction of the *1-A* supervisor. Blanks were then forwarded with job orders attached so that less skilled men could do the work indicated.

These steps had relieved part of the production problem but crowding at *3-A* was still apparent. The solution was found in the same procedure already used. Men were trained to specialize in a single production step such as drilling, forming or welding and this specialization resulted in higher overall production and lowered man-hours per unit. Because of the continuing shortage of thoroughly competent help the system just described was adopted at all the other steps in the production process in the shop. After the new system had been installed the basic operation of the shop had been changed and a smooth flow of production was obtained. Materials which arrived at the receiving dock were stored next to the place where rough blanking was done and each succeeding operation was performed with a minimum of confusion.

The Final Problem

There remained the problem of moving parts from *7*, *7-A*, and *7-B* to further processing stages and the systematization of work at these stages. Also there was the difficulty involved in conveying the products to the ship for installation, since the shop had only one large door leading to the dock. These three problems were solved jointly by a division of the work that remained to be done on the parts into four categories, separating the four in the shop and providing each with access to the dock. This arrangement can be seen at *E* where four new doors were installed opening to the ramp *R* which leads to the ship. The four departments were assigned to experienced men as leaders and each was given some trained helpers and apprentices.

These departments were set up according to the nature of the work. At *H* bulkier products were handled such as elbows and diffusers for air conditioning, ventilation and heating. At *F* ship's equipment was made such as furniture, desks, closets, mess accessories and similar items. Instrument work was done at *G* while tubing systems and small brass and copper parts were produced at *T*. Wheeling benches were used throughout the shop and even used to move parts out to the ships for installation. Ample room for aisles was allowed around all the machinery.

This shop was approximately 65 by 150 ft in area, with each of the departments *H*, *F*, *G*, *T*, including a working area of almost 800 sq ft. These four departments were actually separate shops and each was provided with its own equipment as needed. Final result of the revamping of the shop which has been described was a much smoother flow of materials from the raw state to installation in the ship and a large increase in production from the shop, with fewer skilled workers.

Heater Production

Fig. 2 shows a sheet metal shop arranged for the production of a garage heater. A small company had manufactured this oil fired garage heater for General Motors service departments prior to the war. Its main component was a steel drum 16 in. in diameter and 30 in. high. Material used was 14 gauge steel, not only for the main drum and bottom but also for interior baffles and sleeves. The structural steel framework on which the heater was elevated from the floor and which extended to hold the fuel tank was arc welded. The fuel tank itself was made of 24 gauge terne plate, seamed and welded.

After the war the heater was returned to production but it was enclosed in a square cabinet with well-rounded corners on the top where a register was fitted to allow circulation of the warmed air. Side panels were crackle-finished, corner posts enameled and the crown plated.

Production of this cabinet called for carefully devised sheet metal patterns, a number of new machines and tools and the installation of welding, finishing, enameling and plating equipment. It was necessary to rearrange the shop completely and the new layout is shown in the drawing.

Sections *A* and *B* were added, adjoining the entrance *E*, so that material could be delivered without coming into the shop proper. Sheet and structural material was placed to the right of the entrance *C*, with the stock room *D* remaining intact. The squaring shear *F* was moved to the position shown and a new press brake was installed to form the panels and corner posts, *L* with the smaller, older brake and rolls placed at *M*. The two blanking and forming presses, *G* and *K* were moved from their former central position to the left wall. All equipment used in the fabrication of the heater proper was lined up along the left wall, reaching into the room *O*. Arc welding was moved into *O* to get it off the main floor. Welding jigs are located at *N*. Fuel tanks are sheared at *F*, blanked at *G*, drilled at *S*, formed at *M* and assembled and soldered at *P*. The truck *H* near the shears is used for moving heavy sheets of metal into position at the shears and conveying the 14 gauge parts to *G-K*. The wheeling benches *I* are used for incidental moving of parts.

At the right of the central aisle, facing the rear entrance are new departments, *Q*, *U* and *V* which respectively prepare the cabinet parts for forming at *L-M*, fit the formed parts for easy assembly and finish the metal for its processing through *A* and *B*. At *T* the parts leaving *B* are assembled, inspected at *R*, and conveyed to *W* for shipment.

The cabinet is so constructed that it slides over the top of the heater and fastens by only four bolts to the structural framework supporting the heater. This makes it practical to ship the heater and the cabinet separately. In quantity shipments the cabinet can be shipped knocked down, as it assembles by sliding the panels into specially formed seams in the corner posts. The top piece, which is the air diffuser, rests on flanges provided by the crown of the heater.

Isolating Machinery To Eliminate Noise

W. F. SCHAPHORST
Newark, New Jersey

THESE three sketches show clearly how to install machinery that is likely to vibrate and cause noise. One of the most effective modern methods, as indicated in the sketches, is to isolate the machine from the building or from the ground by means of a strong, resilient material. Natural cork is generally regarded as best for this purpose, since it has a natural period of vibration which is invariably different from that of any machine. Cork is also almost perfectly elastic over a long period of years, that is, it does not gradually yield under pressure as do most other materials. It is also highly resistant to rotting, warping, swelling, and shrinking. From almost every viewpoint natural cork is therefore an ideal material for machine isolation. Sometimes the cork is placed directly under the machine, on top of the foundation as shown

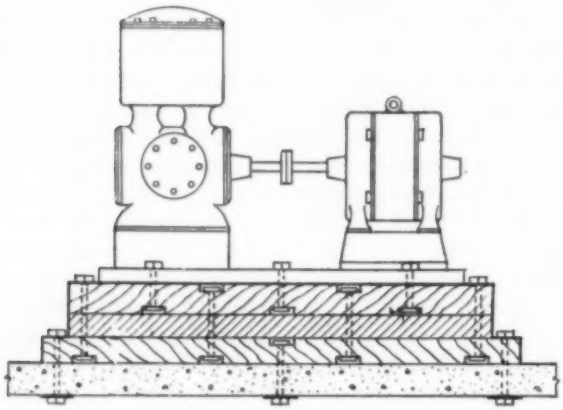


Fig. 1

in Fig. 1. At other times the foundation itself rests on the cork as shown in Fig. 2, depending on conditions. Thus Fig. 1 shows how to isolate an electrically driven unit, the unit being completely tied to a concrete slab in such a way that vibrations cannot be transmitted to the building, and yet the machine cannot work off the base.

Fig. 2 shows how to isolate a machine without secondary tie bolts, such as are shown in Fig. 1. In other words, the concrete base is here placed in a pocket lined with cork. This is usually a very satisfactory method of isolation.

Fig. 3 shows in greater detail how the bolts may be isolated and applied. The use of rubber hose, for further isolating long through bolts, is effective. An objection to rubber is that it soon loses its elasticity, but for this purpose of merely surrounding a bolt that is fixed in position, that fault is of little importance.

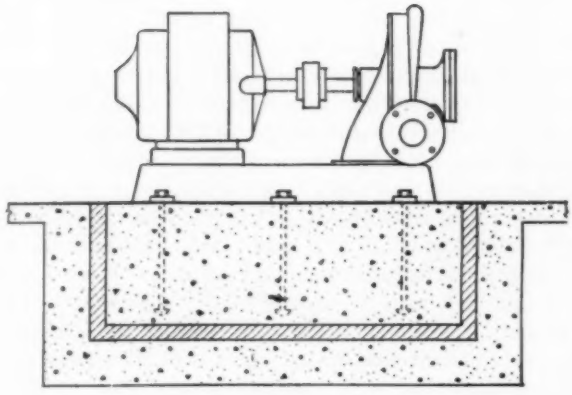


Fig. 2

Through tie bolts are important. Recently the writer observed an erroneous design, the error being in the elimination of tie bolts from a top slab of concrete to the lower slab. In other words, there was nothing to prevent the machine from bouncing around and dragging the top slab around on the floor. The designer may argue. "This machine doesn't vibrate that much". To which a logical reply is: "If the machine doesn't vibrate that much, it very likely doesn't need isolating. Why not be safe and use through bolts? They don't cost much more and provide an additional safety factor."

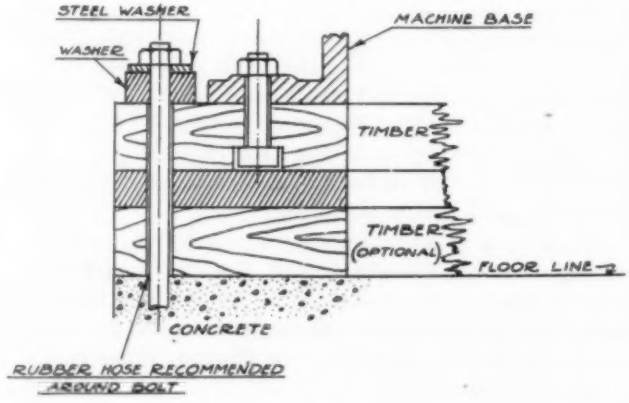


Fig. 3

FOR LONG ROOF LIFE

Shenandoah Life Insurance Company uses COPPER and Common Sense!

On the new home office building (right) for the Shenandoah Life Insurance Co., Inc., Roanoke, Va., this specially designed cupola (left) and the hipped roof are covered with over 40,000 lbs. of copper for lasting protection. Gutters, coping, facia and inside drains are also constructed of copper. Architects and Engineers: Smithey & Boynton; General Contractor: B. F. Parrott & Co., Inc.; Sheet Metal Contractor: Valley Roofing Corp.

Monumentally situated on a high knoll in Roanoke, Virginia, the new home office building for the Shenandoah Life Insurance Co., Inc. is an inspiring combination of functional design and architectural beauty.

This building's all-copper roof and cupola have made history in Virginia's construction field. Gutters, coping, facia and inside drains are also all of copper —and all constructed in accordance with the scientific principles of sheet copper construction developed in the Revere Research Laboratories.

You will find complete information about these new principles in Revere's 96-page manual entitled *Copper and Common Sense.* This book is filled with data that enable you to design or install roofs, gutters, flashing, etc. *that give extra years of service.* By making full use of these data you can always be sure of fine and durable sheet metal construction based on sound engineering principles.

This book has been widely distributed to architects and sheet metal contractors, and probably is in your office files. Be sure to refer to it; and if you do not have a copy, write for one now on your office letterhead.

Revere products—including Sheet and Roll Copper, Lead-coated Copper, Thru-Wall Flashing, Reglet and Reglet Insert Flashing, Vertical Rib Siding, Copper Water Tube, Red Brass Pipe, etc.—are handled by leading distributors throughout the country. A Revere Technical Advisor will always be glad to consult with you without obligation.

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CLEANER PRODUCTION: No scarred parts, no slashed hands, no floors littered by fumbled screws. For when an American Phillips Screw is put on the point of its 4-winged driver . . . then they become one straightline unit until the recessed screwhead is turned up flush and tight . . . the *first* time, *every* time. Saves rejects, saves screws, *saves time up to 50% over out-of-date slotted screws.*

CLEANER SALES: Buyers of modern, top-quality products know the buy-sign of the universal Phillips crossed recess on everything from their automobiles to their golf clubs. To them, the Phillips recess means that when a product is so put together, *it stays put.* To you, it means fewer returns and fewer free servicings, especially where vibration is involved. So remember, from both viewpoints . . . production and sales . . . *American Phillips Screws always cost least to use.*

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ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

California

Possibilities open to the heating industry of securing business from the old home market were discussed by one of the featured speakers at the September meeting of the Institute of Gas Heating Industries, Inc., held at the Nikabob Restaurant in Los Angeles.

John Hall, Southern California Gas Co., contrasted the number of new homes and old homes (10 years old or more) in which many plants were either obsolete or needed major repairs or replacement of equipment. His talk impressed upon the members that while considerable effort must be put forth to get this type of business, there is a large potential for sales of modern heating equipment, thermostats and other accessories which can result in extremely lucrative returns. In closing his talk, he stressed the fact that there is no lack of business in sight for this particular market.

Managing Director E. W. Kimmell's report of the meeting also discussed the progress of the Use of the Seal contest which the institute is sponsoring to serve as incentive for members to make use of the institute seal in their advertising and promotional campaigns. Monthly score sheets are available to members on which they can rate themselves by scoring points for number of decals displayed, displays of the Code of Ethics in their offices, use of the seal on company printed matter, and in advertisements. Extra points may be added for ingenuity in using the seal in any new and unusual way.

Sam Jaffe, chairman of the Advertising and Publicity Committee, who reported on the contest, also described award cups and merchandise offers which will be given as prizes in the contest.

Canada

The Canadian Chapter of the National Warm Air Heating and Air Conditioning Association announces via its monthly news letter that the final draft of the chapter's Warm Air Heating Master Code has now been completed. This code contains both gravity and winter air conditioning sections and "is intended primarily to prescribe reasonable provisions based on minimum requirements for safety of life and property from fire, and secondly to provide the highest practical degree of efficiency in heating." A limited distribution of the code was recently made to various sheet metal contractors' associations throughout Canada and to municipal boards in cities where chapter schools have been held. Therefore, the code is subject to revision when comments are received from these bodies. After any necessary revisions are incor-

Coming Events

Nov. 18-19—Sheet Metal, Air Conditioning and Roofing Contractors' Association of Pennsylvania, Annual Convention. Berkshire Hotel, Reading, Pa. E. W. Liebermann, Secretary-Treasurer, 1411 Merchant St., Ambridge, Pa.

Dec. 9—Canadian Chapter, National Warm Air Heating and Air Conditioning Association, 6th Annual Meeting. Chateau Frontenac, Quebec City, Canada. C. B. Taylor, Managing Director, Royal Bank Bldg., Toronto 12, Ont.

Dec. 14-15—National Warm Air Heating and Air Conditioning Association, 36th Annual Convention. Hotel Cleveland, Cleveland, Ohio. George Boeddener, Secretary-Treasurer, 145 Public Square, Cleveland 14, Ohio.

Jan. 23-27, 1950—American Society of Heating and Ventilating Engineers, Southwest Air Conditioning Exposition. State Fair Grounds, Dallas, Texas. E. K. Stevens, Associate Exposition Manager, Grand Central Palace, New York City.

Feb. 2-3, 1950—Sheet Metal and Warm Air Heating Contractors Association of Indiana, Inc., Annual Convention. Hotel Severin, Indianapolis, Ind. Frank E. Anderson, Secretary, 439 So. 17th St., Terre Haute, Ind.

Feb. 19-23, 1950—National Association of Home Builders, 6th Annual Convention and Exposition. Stevens and Congress hotels, Chicago, Ill. Paul S. Van Auken, Exposition Director, 111 W. Washington Blvd., Chicago.

Feb. 20-22, 1950—Sheet Metal Contractors Association of Wisconsin, Inc., Annual Convention. Schroeder Hotel, Milwaukee, Wis. Irving F. Kanitz, Executive Secretary, 225 E. Michigan St., Milwaukee 2, Wis.

Feb. 27-March 1, 1950—Ohio Sheet Metal Contractors' Association, Annual Convention. Carter Hotel, Cleveland, Ohio. M. J. Cutter, Chairman, 4408 St. Clair Ave., Cleveland 3, Ohio.

Apr. 11-13, 1950—New York State Sheet Metal, Roofing and Air Conditioning Contractors' Association, Inc., Annual Convention. Hotel Syracuse, Syracuse, N. Y. Clarence J. Meyer, Secretary, 567 Genesee St., Buffalo 4, N. Y.

May 8-10, 1950—Sheet Metal Contractors' National Association, Annual Convention. Netherland Plaza, Cincinnati, Ohio. J. D. Wilder, Executive Secretary, 170 Division St., Elgin, Ill.

porated, the code will be issued in serviceable binding to all bodies requesting a copy.

The Technical Advisory Committee of the Canadian chapter rates coal and wood burning furnaces marketed by manufacturer members and also supplies conversion ratings for stoker and oil firing. These ratings are calculated by application of equations developed at the University of Illinois. However, the chapter has realized for some time that additional testing should be conducted in Canada to investigate applications of the equations to stoker and conversion firing of furnaces manufactured in Canada, which are not typical of the units on which the equations are based. Additional testing program would also cover larger furnaces having ratings beyond the scope of the equations, rating of wood burning furnaces, and rating of units designed specifically to burn oil. For this purpose, arrangements have been made with Queen's University, Kingston, Ont., to initiate a testing program, which may extend over a number of years. This is considered a memorable step toward the Canadian chapter's goal of serving both the industry and the Canadian public more efficiently.

Pennsylvania

The Sheet Metal, Air Conditioning and Roofing Contractors of Pennsylvania, an association which has been inactive since before World War II, is holding its first convention as a reorganized group on November 18 and 19 at the Berkshire Hotel in Reading, Pa.

C. F. Luppold, convention chairman, will preside over the opening session on Friday morning. At this session, J. D. Wilder, executive secretary of the Sheet Metal Contractors' National Association, will extend a welcome to the state association, and A. J. Sabathne, president of the Pennsylvania association, will outline the program of action. Following Mr. Sabathne's talk, G. J. Nicolli, president of distributors' and salesmen's auxiliary, will extend a message of welcome.

The theme of the afternoon session will be Organization. Featured speakers on this subject will be Henry Johnston, Reading, Pa.; A. B. Hall, president of the New York State Association of Sheet Metal, Heating, Air Conditioning, and Roofing Contractors; and E. K. Thompson, secretary of the auxiliary, Pennsylvania association.

An open forum at which Mr. Sabathne will preside will conclude the Friday sessions. A social program including cocktail hour and card party is scheduled for the evening.

Saturday morning's session will highlight the subject of Teamwork. Sports viewpoint of the subject will be presented by Hope Benford, Dean of Freshmen, Muhlenberg College, Allentown, Pa., and by Bill Holland, 1949 winner of Indianapolis automobile races. Teamwork as applied to vocational training will be discussed by Joseph Burke of the CIO, Philadelphia, and by Fred Hare, Somerset, Pa., Pennsylvania state senator.

Installation of officers for 1949-50 will take place at 11:30 after which sessions will adjourn for lunch.

The afternoon session will be devoted to consideration of Sales and Service from the manufacturer's, national, and contractors' viewpoints. Featured speaker will be James Martin, chairman of distributor relations of the National Warm Air Heating and Air Conditioning Association. After the addresses, committee reports will be heard and the convention city for 1950 will be chosen.

A banquet, at which an outstanding speaker will be heard, and a dance for members and guests will bring the convention to a close.

Michigan

In the October bulletin of the Michigan Sheet Metal, Roofing, Heating and Air Conditioning Contractors' Association, Secretary N. J. Biddle reports on a trip which he recently took to cities on Michigan's Northern Peninsula for the purpose of getting acquainted with contractors of that area. Among the cities visited were Oscoda, Greenbush, Alpone, Rogers City, Gladstone, Escanaba, Iron Mountain, Ishpeming, Marquette, and Sault Ste. Marie.

The secretary reports that contractors in the area are striving against great obstacles to uphold proper industry standards without any assistance from governmental authority in outlawing substandard work. All contractors working under this handicap are fully in favor of state regulation in the form of an adequate state code for the industry.

A joint meeting of all the contractors in the northern area is planned for the evening of January 27, 1950, at the Northland Hotel in Marquette. President Dee Cramer of the Michigan association plans to attend and the association urges all members to turn out for this meeting if they can possibly do so.

Another interesting item from Mr. Biddle's report is the announcement of the amendment of the Dearborn, Mich., heating ordinance which took place at the council meeting on October 4. The amended ordinance provides that contractors are to secure their licenses in the same manner as before, but that prior to securing a permit to install work, they must "file with the city clerk a certified copy of a products liability insurance policy, insuring the contractor against claims for loss, injury to persons or damage to persons or property by reason of defective installation and/or defective equipment in the amount of not less than $10,000 for each accident." However, it was also stated that the above provision should be waived "if the manufacturer, jobber, wholesaler, or retail dealer carries a satisfactory products liability policy and files a certified copy of same with the city clerk."

A slight change was made in qualifications of an inspector to the effect that he must now hold an unlimited journeyman's license. The amendment further provides that owners wishing to do their own heating job must carry or provide for the same insurance coverage as a contractor. In addition, specifications were adopted for installation of gas fired floor furnaces, and gas burners and gas burning equipment were defined.

The amended ordinance sets a new pattern, according to Mr. Biddle, in that it seems to have the effect of prequalifying heating equipment by requiring insurance in much the same manner as AGA approval prequalifies it.

NASMD Studies Operations, Business Prospects

THE Thirty Ninth annual meeting of the National Association of Sheet Metal Distributors convened in Atlantic City, New Jersey on October 11th, in an atmosphere of uncertainty about the steel situation, a vital subject to this organization. The morning session was called to order by President John Speck and discussion panels on the mechanics of the business took up the allotted time.

After the afternoon session had been called to order, Thomas Fernley, executive secretary of the association reported on the activities of his office. He began by exhorting all members to use the facilities and services of the secretary's office to the fullest possible extent. The new Overhead Expense Report was described to members and its value explained. The distributor can use this report to ascertain whether his overhead expenses are in conformity with the average expenses incurred by other members of the association. A master list of delinquent accounts has been developed and circulated among the members and has been helpful in preventing losses to bad credit risks. The surplus stock bulletins have aided the member distributors in liquidating merchandise which they were unable to move. Mr. Fernley concluded by listing the reports on various topics which are available from the secretary's office and thanking President Speck for his fine work during the past year.

Next speaker on the afternoon program was R. S. Hammond, vice president and general manager of Johns-Manville Corporation and his topic was the responsibilities of wholesalers and manufacturers to each other. He advocated a responsible partnership in this matter and said:

"We must be partners first in producing and delivering the right quality of materials. We must be partners in establishing the right kind of sales policies. We must be partners in doing whatever it takes to win the confidence of both the dealer and the ultimate consumer."

In defining the responsibilities of the wholesaler, Mr. Hammond spoke from the experience of his own company and brought out the importance of the fact that the wholesaler is well acquainted with the limitations of his dealer customers and is able to maintain closer contacts with them than can the manufacturer. The maintenance of storage and distribution facilities by the wholesaler is also of importance to the manufacturer, since it relieves him of considerable financial responsibility.

Mr. Hammond then spoke of the criticism which has been leveled at the building products industry in regard to its distribution system, but he claimed that costs to the ultimate consumer are lower with the present system than they would be otherwise. In conclusion, the speaker defined again the responsibilities of the wholesaler to the manufacturer and the corresponding obligations of the manufacturer.

Next speaker was David C. Melnicoff, associate economist, Federal Reserve Bank of Philadelphia, who spoke on the general business outlook and gave a well-documented analysis of the economics of the present situation in this country. He also discussed the long term future of American business and found much to look forward to in the way of business activity and prosperity.

Final speaker on the program was David C. Roscoe, assistant general manager of sales, Bethlehem Steel Company, who spoke on "The Steel Situation."

After tracing the recent history of steel production prior to the steel strike, Mr. Roscoe delved into the fundamental reasons for the shortage of galvanized steel. One of these was the integration of many mills in which a manufacturer bought a galvanized steel producing mill and absorbed its entire output. The most important reason, however, has been the dislocation caused by the transition from hand sheet mills to continuous cold reducing mills. The success of this transition is indicated by the fact that shipments of galvanized sheets and roofing totaled 996,114 tons in 1938 and 1,643,337 tons in 1948, despite the decreased number of plants and producers of this product. Mr. Hammond said that the industry now has capacity to make 2.5 million tons of galvanized steel a year and he does not expect shortages to continue.

The resolutions committee urged all members to request passage of the basing point bill and also to support a bill which has been introduced in both branches of Congress advocating taxation of cooperatives on the same basis as corporations.

Officers were elected for the coming year and adjournment followed.

1950 Officers

President.....Ray P. Farrington
Potts-Farrington Co.,
Philadelphia, Penn.

1st Vice President.....Alexander Thompson
Tanner & Co., Indianapolis, Ind.

2nd Vice President.....Wm. H. Bowe
Herrick Co., Boston, Mass.

Executive Committee

Lee J. Haines.....E. E. Souther Iron Co.
St. Louis, Mo.

P. J. McKenney.....Conklin Tin Plate & Metal Co.
Atlanta, Ga.

A. G. Earnshaw.....Earnshaw Sheet Metal Supply Co.
Mansfield, Ohio

EQUIPMENT DEVELOPMENTS

Light-Level Unit 208

Level equipped with a self-contained light for use on dark interior jobs is being offered as the Luma-Level.

Combination of light and level in one unit permits leveling with one hand, and finger-tip control provides accurate readings with a flick of the thumb. Luma-Level is a precision tool, machined from cast aluminum and is light enough to be carried in pocket or tool kit.

Polished aluminum case contains the horizontal, vertical, and 45 deg angles, plus the light, which is furnished by a small flash light bulb and pencil light battery. New battery and bulb can be inserted by merely removing the side panel.

International Manufacturing Co., Denver, Colo.

Packaged WAC Unit.....209

Packaged oil fired warm air conditioner, rated at 90,000 Btu, will supply 3 gal per minute of domestic hot water. Using the boiler burner unit as a heat exchanger, steam rises into a copper finned radiator and heat is then delivered to the duct by a blower. Domestic hot water coil is immersed at all times in the heating body. Unit is only 20 in. wide, 69 in. high, and 48 in. long, compact enough to fit into small homes.

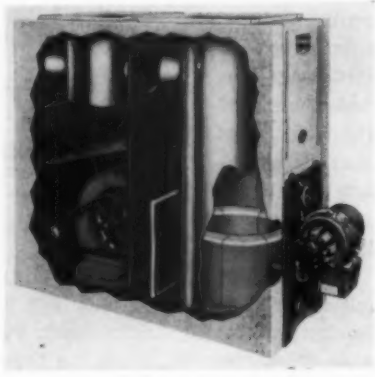
Hi-Therm units are packaged, ready for firing. Combustion chamber is built in, burner bolted to floor straps and all controls wired and mounted. Units are equipped with electronic controls.

Petroleum Heat and Power Co., Stamford, Conn.

Use Coupon on Facing Page

Oil Fired Conditioner.....210

Oil fired winter air conditioner is available in two sizes delivering 63,000 and 80,000 Btu at the register. Features are its large heavy gauge welded body and economizer, tailor-made burned refractory combustion chamber, flange mounted



oil burner, and resiliently mounted blower.

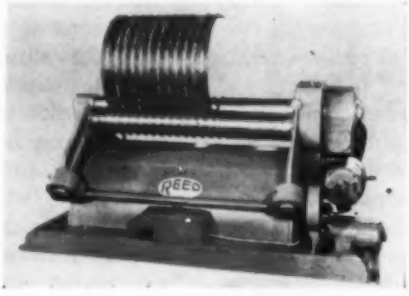
Semi-slip joint cabinet is finished in maroon and gray.

Thatcher Furnace Co., Garwood, N. J.

Corrugated Roll Former...211

Series 600 corrugated roll machines are equipped with three corrugated shafts which can be designed to fit any standard type corrugation.

Primary purpose of machine is to roll sheets, which have been previously corrugated, into circular and semi-circular forms for articles such as curved roof panels, culvert pipe, grain bins, etc. Machine is equipped with power adjustment on forming roll which establishes the curvature of the sheet. It is also equipped with air operated drop end which permits quick removal of fully rolled circles.



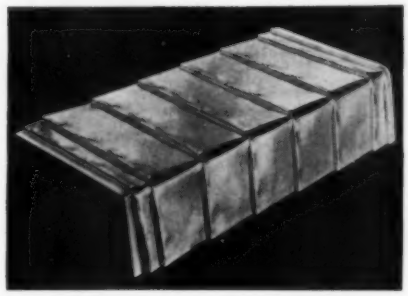
Machine is equipped with bronze bearings throughout and has totally enclosed silent worm gear drive. Has main driving motor of 5 hp and auxiliary motor for adjusting the rear roll of 1½ hp. Overall dimensions are 40 in. wide by 102 in. long.

Reed Engineering Co., 1003 W. Fairview Ave., Carthage, Mo.

Flashing System 212

Complete system of solid copper flashing for masonry construction is now available. It consists of through wall flashing, reglet and reglet insert flashing, and vertical rib siding.

Flashing, which is said to be both economical and easy to install, is made from both 10 and 16 oz copper and furnished in sheets of required



width and standard lengths of 42 in.

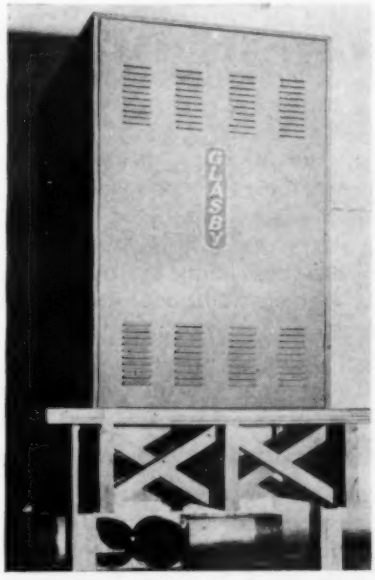
The Simplex reglet is designed to provide a permanent watertight connection between concrete and copper flashing. Formed of 16 oz copper, it is furnished in strips 61 in. long. Insert flashing is formed of 10 oz copper with ⅛ in. high undercut sawtooth ribs spaced 3 in. apart.

Vertical rib siding is designed for waterproofing high parapet walls, penthouses, and similar structures. Ribs permit a locking overlap where joints must be made, eliminating need for soldering.

Revere Copper & Brass Incorporated, New York 17, N. Y.

Down-Flow Furnace 213

Gas fired winter air conditioner, embodying a special built-in blower, is designed for use in basementless and semi-basementless houses, to eliminate unnecessary ductwork, cold floors, and draft conditions. In operation, return air is drawn from underfloor plenum up over furnace and is blown down through



furnace into supply plenum under the floor. Standard round pipe and elbows can be used as underfloor ducts.

Burner is an open port turbulent flame burner built especially for this unit. Fan and limit control is furnished as standard equipment. All servicing of burner, blower, and controls is done from the front. Motor blower assembly is single unit.

Furnace sets on floor on an angle frame for easy servicing.

J. P. Glasby Mfg. Co., Inc., Belleville 9, N. J.

Drill Converter 214

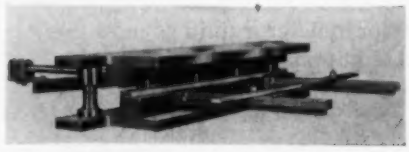
Attachment of light weight unit called Grip-Torq allows any ¼ in. electric or air drill to be converted into a multi-purpose tool for heavy duty boring, reaming, screw driving, etc. Grip-Torq is a compact speed reduction unit incorporating a geared mechanism which increases torque output approximately 5 to 1. It is controlled by gripping or releasing body of the unit which starts or stops the working tool while drill motor continues to run.

According to the manufacturer, unit permits use of a 1¾ in. bit in wood, ½ in. metal drill or a 3 in. hole saw in metal.

McLaughlin & Co., 909 E. 59th St., Los Angeles 1, Calif.

Press Attachment 215

Shearing die attachment to be used for shearing applications in the manufacturer's Model 3048 Multi-Max punch press enables press to be used as combination punch press and power squaring shear. With shearing die attach-



ment, press can be easily converted into a 10 ga, 48 in. power squaring shear in a few minutes. Attachment is equipped with adjustable front and back gauges identical with those used on power squaring shear. Hold downs are of one piece construction, stripper type spring loaded.

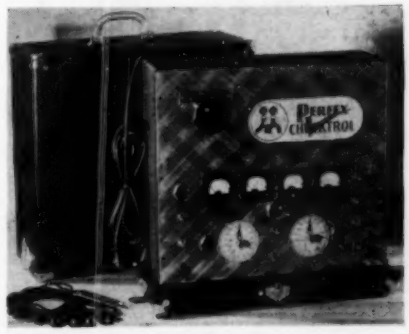
Alloy steel blades, with four cutting edges, are heat treated and ground to extreme accuracy. Cutting length is 48 in.; cutting thickness is 10 ga. Slope per foot of blade is ⅜ in. per foot. Back and front gauges have maximum range of 24 in. each.

Diamond Machine Tool Co., Los Angeles 23, Calif.

Controls Tester 216

Portable control tester, known as Checktrol, offers a fast, accurate means of checking domestic heating controls.

The unit will enable distributors of this manufacturer's line to pro-



vide customers with a checking service thus eliminating necessity of returning any but actually defective controls for repair or replacement. It is expected to save the dealer or distributor much needless expense and to enable him to give more efficient service.

Perfex Corp., Milwaukee, Wis.

MAIL THIS NOW!

We will ask the manufacturers to send full particulars about the products and literature mentioned. 11-49

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Equipment Developments

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Name .....

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Address .....

Address: AMERICAN ARTISAN, 6 North Michigan Ave., Chicago 2, Illinois

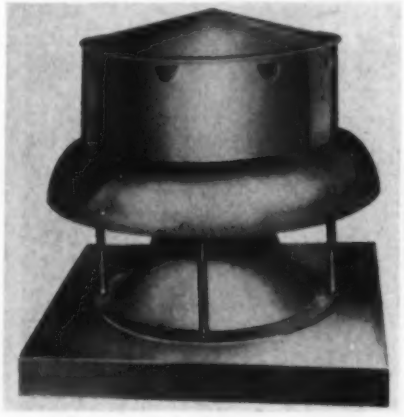
EQUIPMENT DEVELOPMENTS

Use Coupon on Page 111

Power Ventilator 217

Power air exhausting unit known as Air-Van is made in low silhouette design to answer problems of modern architecture. Capacities range from 150 to 12,000 cfm.

Featured is an enclosed motor which is out of air stream, eliminating corrosive action by either



moisture or chemical fumes, as well as explosive danger. Motors are pancake type with grease sealed bearings for long life. Exhauster employs squirrel cage fan with blades designed to give maximum and positive air expulsion. Unit is completely weatherproof; no back draft damper is required.

Available in special metals if desired.

The Gallaher Co., Omaha, Nebr.

Soldering Salts 218

Farco soldering salts, containing spirits of metal, is a pure white crystal that dissolves instantly in two parts of water. It is said to be useful for making flux of any strength to fit a particular job. Spirits of metal increases wetting action on the metal and also increases the tinned surface and tensile strength of the bond.

Recommended as a fast and efficient flux on galvanized steel, iron, brass, copper, or any common metals. Mixture of one part to six is said to make excellent flux for soldering iron dip.

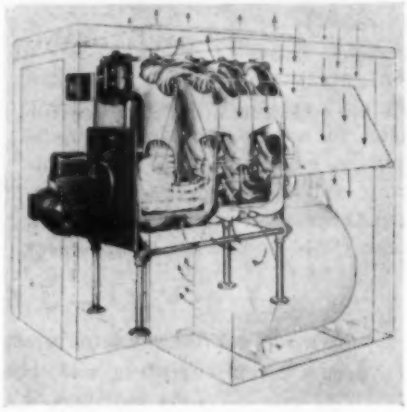
Farrelloy Co., 1258 N. 26th St., Philadelphia 21, Pa.

Automatic Conditioner ...219

Oil fired winter air conditioners, trade-named Unique, are now available in three additional models. Distinguishing feature is sectional heat exchanger that provides longer path for hot flue gases for maximum heating effect.

Heat exchanger is constructed of special alloy iron allowing very thin walls which give extremely high and uniform rate of heat transfer.

Other features include a refractory lined combustion chamber for efficient oil combustion; large blower for quieter running; and complete automatic control.



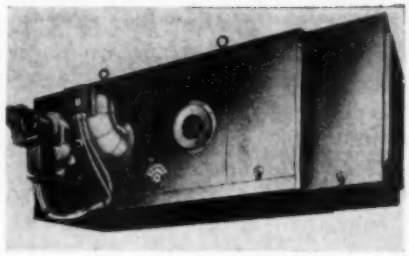
Three models range in capacity from 84,000 to 157,000 Btu.

Excelsior Steel Furnace Co., 118 S. Clinton St., Chicago 6, Ill.

Suspended Furnace 220

Model 540 suspended oil fired furnace is recommended for use in heating garages, churches, stores, schools, small factories, and warehouses. Unit has a rated output of 125,000 to 150,000 Btu at bonnet. It features a cylindrical combustion chamber made of heat-resisting, non-corrosive chrome steel.

Axial flow, direct drive, 2 speed blower is rated to deliver 1,800 to



2,000 cfm. Specially designed adjustable fan blades regulate amount of heated air delivered.

Furnace is fully automatic. Thermostatic control starts burner and turns on blower. Air flow is established at low blower speed; blower automatically steps up speed as bonnet temperature increases.

Complete unit, weighing only 600 lbs, can normally be suspended from existing ceiling beams or girders, without additional structural support.

Perfection Stove Co., 7609 Platt Ave., Cleveland 4, Ohio.

Portable Sander 221

Portable electric sander for sanding wood, metal, and stone is equipped with endless sanding belts 4½ in. wide by 26 in. long. Features a direct spur gear drive, rapid belt change device, and new heat radiating system said to increase belt life. System consists of open-end construction, with belt motion creating air currents to blow generated heat away and heavy section aluminum fins to conduct heat to a flat radiating surface which forms top housing of the tool.

Simplified tracking arrangement permits easy centering of belt on roller pulleys; special internal device prevents belts from wearing inner surfaces of housings.

Available in two models—with or without dust collecting system. Complete line of sanding belts in various grades and grits plus polishing cloth is available.

Independent Pneumatic Tool Co., Aurora, Ill.

Power Press Brake.....222

Low priced power press brake is designed to replace hand press brakes and to eliminate tying up big machines on small odd jobs. Known as the 16-48, it has a bed and ram length of 48 in. Rated air bending capacities range from a 48 in. length of 16 ga stock (over a ½ in. opening) to a 24 in. length of 10 ga stock (over a 1⅛ in. opening).

Unit all steel construction, unusual among smaller machines, is employed to assure perfect alignment and maximum rigidity. Gears are steel with machine cut teeth. Other features include totally enclosed friction clutch, self-releasing band brake, and Alemite hand fittings for convenient lubrication. Variable speed arrangement provides 20 to 50 strokes per minute operation.

The 16-48 may be mounted on casters if portability is required.

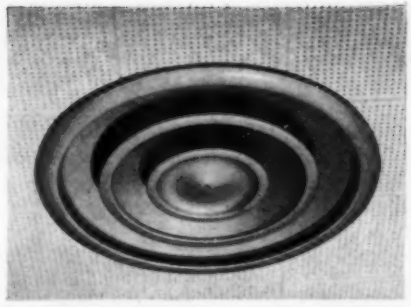
Verson Allsteel Press Co., 9322 S. Kenwood Ave., Chicago 19, Ill.

Ceiling Outlets 223

Model J Venturi Flo outlets feature attractive styling, adjustable air pattern, and high air diffusion efficiency. A screw in center of unit provides rapid positive adjustment of supply air pattern from horizontal to vertical deflection.

Outlets are finished to harmonize with any architectural surroundings; available in gray prime coat, metalescent aluminum, or wide variety of electroplated finishes. Rapid temperature equalization and draftless air distribution are insured by venturi design to mix room air with supply air at outlet.

Model JC, similar to Model J in appearance, has key adjustment of



return air volume as standard feature. Recommended for systems where structure will not permit installation of return outlets in sidewalls.

Barber-Colman Co., Rockford, Ill.

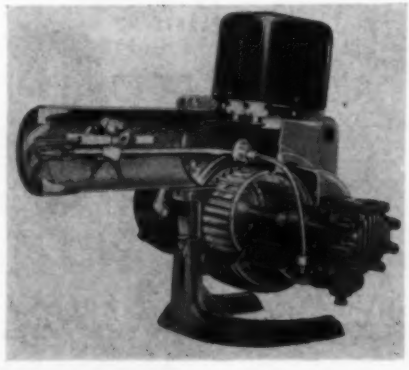
Hi-Boy Conditioner 224

Hi-Boy model winter air conditioner, No. 534-10B, is rated at 84,000 Btuh maximum output at bonnet. Oil burner, blower, and filters are standard equipment, as well as refractory combustion chamber. Standard controls include barometric draft regulator. Humidifier is available as optional equipment. Steel cabinets are finished in gray which harmonizes with basement decorative scheme and furnishings.

Williamson Heater Co., Cincinnati 9, Ohio.

Pressure Burner 225

Improved pressure oil burner has firing rate of ¾ to 3 gph. Inverted design prevents nozzle after-drip. Hinged transformer permits instant accessability to nozzle assembly. Electrode assembly eliminates high tension wire leads.



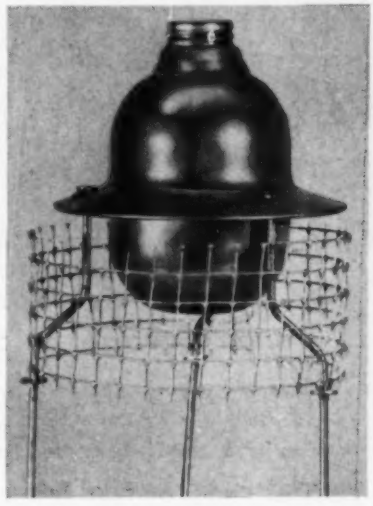
Other features are streamlined blower housing which permits smooth flow of air, lowering noise level; simplified electrical connection which is accomplished in rear of blower housing. Blast tube is separate part of blower housing and various tube lengths are interchangeable without special tools.

Steel enameled enclosure jacket completely enclosing the burner is obtainable as an accessory.

Delta Heating Corp., 85-07 Northern Blvd., Jackson Heights, N. Y.

Roof Drain Guard.....226

No-Freeze accessory for roof drains contains a chemical that prevents drains from freezing and causing water damage to ceilings



and sidewalls. Standard size fits pipes from 2 to 6 in.

David Levow, 308 W. 20th St., New York 11, N. Y.

Improved Blow Torch.....227

Popular priced blow torch, No. 330 S, incorporates many improvements designed to give more efficient performance. Shut-off valve is equipped with replaceable needle pin; small spring on pump plunger keeps washer spread for positive pumping action. Fuel line from tank to burner is equipped with mesh strainer control to prevent flash back. Other features include ribbed reinforced bottom, heavy steel priming cup, and long undervein with cleanout plug.

All tank inlets and connections are mechanically locked into position. Descriptive literature is available on request.

P. Wall Manufacturing Co., Grove City, Pa.

Every Wheel Must Pass – with Honors –

This PRECISION BALANCE TEST

- Freedom from Vibration
- Extra Quiet Performance
- Long Service Without Attention or Repairs

No Wonder So Many Manufacturers Furnish Clarage as Standard!

Wheels in perfect balance are of utmost importance — if your blower units for heating and air conditioning are to give satisfactory, long-time service.

That's why we take such great pains with balancing operations here at Clarage Fan! Every wheel is tested on highly sensitive, electro-dynamic machines as shown above. *Both static and dynamic balance are obtained simultaneously — and to within precision limits.*

Yet accurate balance is but one of the many highly desirable features found in Clarage Blower Assemblies.

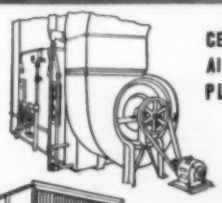
To meet your future requirements, it will most certainly pay you to investigate these fans.

Built in ten sizes in both types as illustrated — capacities from 200 to 7800 c.f.m. Or wheels only can be furnished in the same ten sizes.

Both types are suitable for V-belt or direct motor drive.

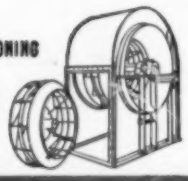
SOME OF OUR OTHER PRODUCTS

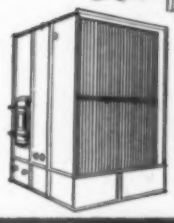
UNIT HEATERS



CENTRAL STATION AIR CONDITIONING PLANTS

LARGE AIR CONDITIONING AND VENTILATING FANS





AIR WASHERS

CLARAGE

FAN COMPANY

Kalamazoo, Michigan

APPLICATION ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

You won't have to look far to see the sweeping trend toward more attractive and inviting store fronts. And you'll find that modernizing with Armco Stainless Steel not only means *more business* for the store owner, but also *more profit* for you.

Chances are there are a number of stores with good remodeling possibilities in your community. Why not check them now? In many cases you won't have to make any serious structural changes. Just cover the old masonry or wood with stainless, style it up a bit and you have another handsome and profitable job.

You can recommend durable Armco Stainless Steel with complete confidence. Tell prospects that this bright, rustless metal is a wise investment in long, trouble-free service. Point out that its hard, smooth surface resists scratching and denting . . . that it cleans up quickly and, above all, it keeps its gleaming customer-appeal year in, year out.

You can readily shear, form, weld, solder and polish Armco Stainless in your shop with standard methods and equipment. The nearby Armco Distributor will be glad to give you a copy of Armco's up-to-date, fully illustrated manual, "Stainless Fabricating Tips."

He is ready also to make quick delivery of Armco Stainless Steel sheets, strip, bars, angles and fasteners. If you don't know his name, write Armco Steel Corporation, 4139 Curtis Street, Middletown, Ohio. Export: Armco International Corporation.

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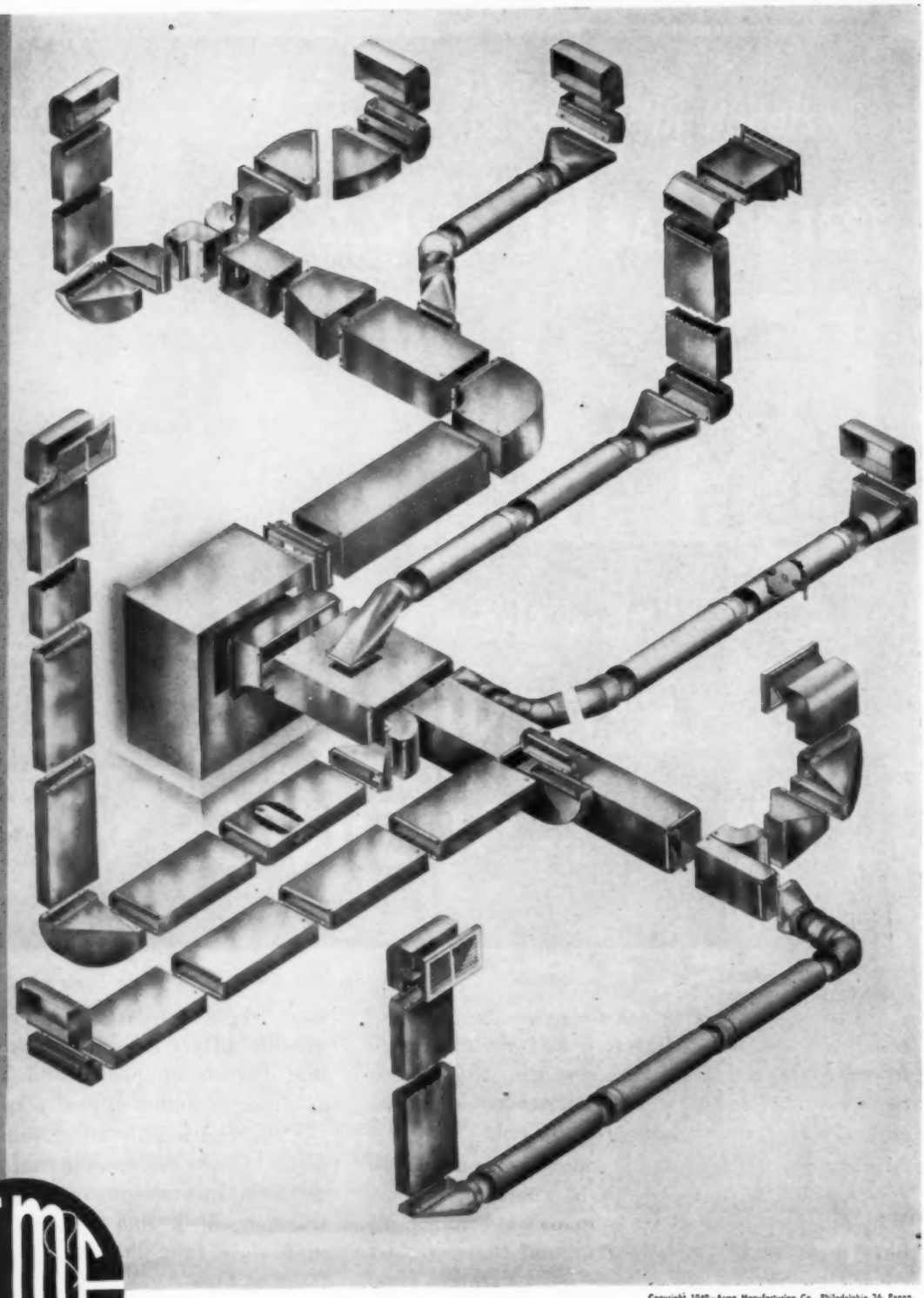
Trade Mark Registered

as it looks!



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with

ACME

prefabricated

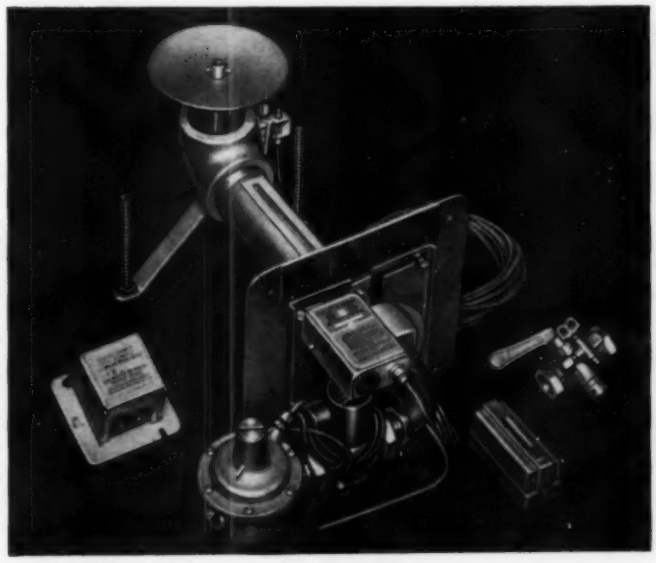
FORCED AIR FITTINGS

ACME MANUFACTURING CO.
PHILADELPHIA 36, PENNSYLVANIA

MANUFACTURERS DISTRIBUTORS, DEALERS:

Here is TOP performance in the LOWEST COST BURNER on the MARKET at rated capacities!

See Us at Booth 66 at The Institute of Cooking and Heating Appliance Manufacturers' Convention in Cincinnati.



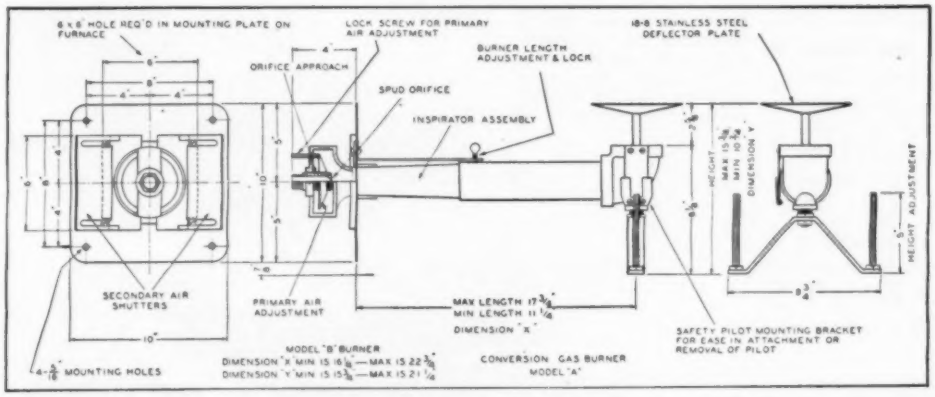
Monoport

A.G.A. CERTIFIED GAS BURNER

Supplied under your own name, if desired, for conversion or original equipment use

WRITE US FOR LOW-PRICE AND AMPLE DISCOUNT SCHEDULE for these burners, listed by the American Gas Association in the October, 1949 Supplemental Directory of Approved Gas Appliances and Listed Accessories. Certificate of Listing No. 20-(225.0 & .1).001.

Model Number	Trade Name		Max. Input Rating BTU per Hr.	Min. Input Rating BTU per Hr.
For Use With Natural, Mixed and Manufactured Gases				
175-A, 175-B	MONOPORT	Nat.	175,000	50,000
		Mixed	175,000	50,000
300-A, 300-B	MONOPORT	Nat.	300,000	50,000
		Mixed	300,000	50,000
		Mfg.	250,000	50,000


6 x 6" HOLE REQ'D IN MOUNTING PLATE ON FURNACE
LOCK SCREW FOR PRIMARY AIR ADJUSTMENT
18-8 STAINLESS STEEL DEFLECTOR PLATE
BURNER LENGTH ADJUSTMENT & LOCK
ORIFICE APPROACH
SPUD ORIFICE
INSPIRATOR ASSEMBLY
SECONDARY AIR SHUTTERS
PRIMARY AIR ADJUSTMENT
MAX LENGTH 17 3/8"
MIN LENGTH 11 1/16"
DIMENSION "X"
SAFETY PILOT MOUNTING BRACKET FOR EASE IN ATTACHMENT OR REMOVAL OF PILOT
HEIGHT ADJUSTMENT
4-7/16" MOUNTING HOLES
MODEL "B" BURNER
DIMENSION "X" MIN IS 16 3/8" — MAX IS 22 3/8"
DIMENSION "Y" MIN IS 15 3/8" — MAX IS 21 1/16"
CONVERSION GAS BURNER MODEL "A"

Available with either Minneapolis-Honeywell or White-Rogers controls.

☆

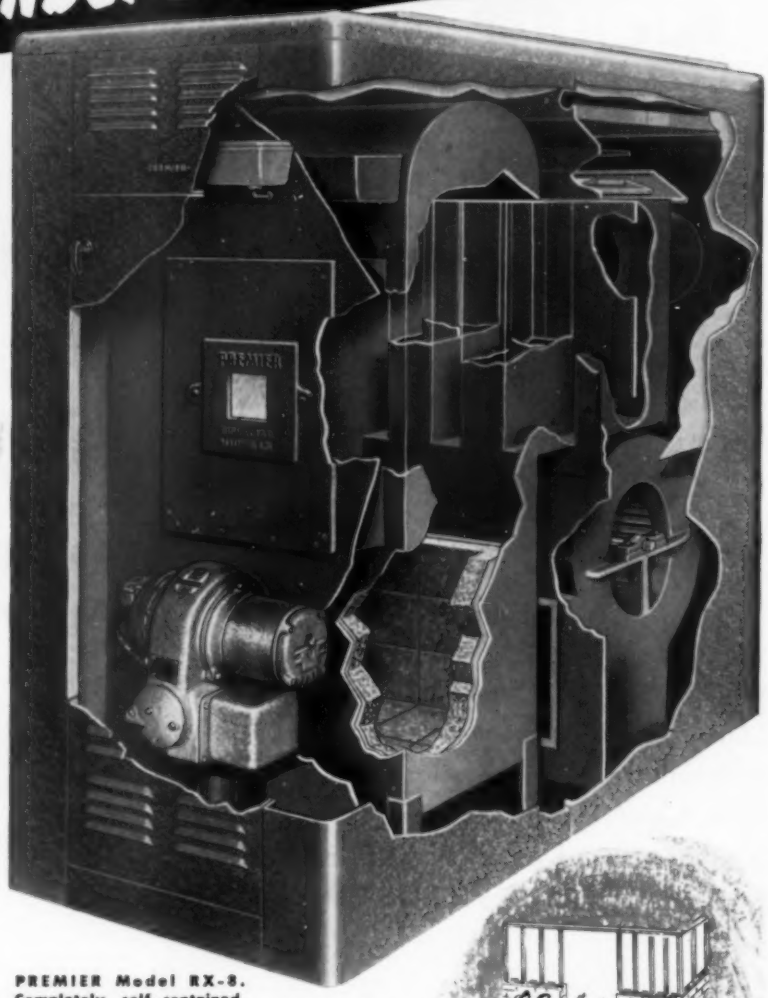
SAMPLES FOR YOUR TESTING WILL BE PROVIDED AT ONCE IF ORDERED IMMEDIATELY.

MODERN CONTROLS CORP.

7620 KERCHEVAL STREET
DETROIT 14, MICHIGAN

Never Before Has PREMIER Offered Such a Complete Line and Such a Complete Merchandising Program

FOR INDEPENDENT DEALERS



PREMIER Model RX-8. Completely self-contained, automatic oil air conditioner. Quiet. Very good looking. Up to 117,600 B.T.U.

PREMIER has the line and the program to help Independent Heating Dealers *stay independent.*

The PREMIER line today is the most complete in PREMIER history. With this line you can supply every demand of the warm air heating market. Every unit is tops in construction, outstanding in appearance, surprisingly low priced. PREMIER also gives you a complete cooling line, for profitable warm weather sales.

The PREMIER program gives the dealer the fullest measure of cooperation, in merchandising, engineering, financing. PREMIER works shoulder-to-shoulder with you, to help you get more business, make the best installations, and earn better profits.

In the days of increased competition ahead, the PREMIER Exclusive Franchise is going to be more valuable than ever before. Inquire about it — now!

PREMIER FURNACE COMPANY

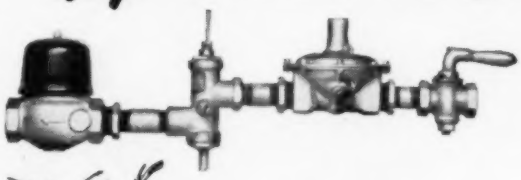
Heating and Air Conditioning Products

30TH YEAR
SAME OWNERSHIP
SAME MANAGEMENT
SAME SALES POLICY

Dowagiac, Michigan

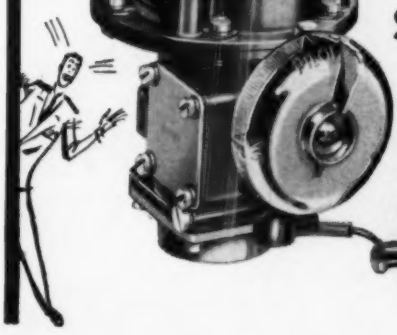
The Simplest Installation In the Industry

Replace This



Present Multiple Assembly of up to Five Separate Gas Control Units

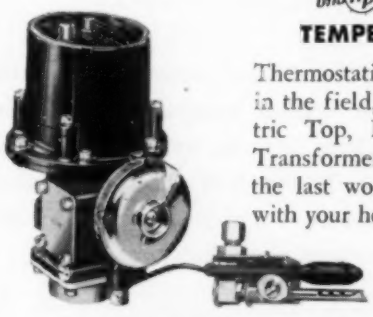
With THIS



New GASAPACK "One Does All" Control . . . Simplified Cost-Cutting, DEPENDABLE

New GASAPACK Revolutionizes Gas Control in Circulating Heaters!

Actually, the new A-P GASAPACK eliminates all piping in your heater! Even the burner spud is an integral part. You tighten only 2 screws on a bracket to mount the GASAPACK. Then it's ready to connect to gas main. Every other control function is built in — pressure regulator, solenoid, Pilot filter, A-cock, B-cock. Takes less room than ONE of these separate units — only 5½" x 5½" x 3⅞".



GASAPACK AUTOMATIC TEMPERATURE CONTROL

Thermostatic Control "kit," easy to add in the field, includes: Automatic Electric Top, Low Voltage Thermostat, Transformer and all fittings. Provides the last word in heating convenience with your heater.

NEW GASAPACK MODEL 54 "ONE DOES ALL" GAS CONTROL FEATURES:

- 100% FAIL SAFE OPERATION
- 100% SAFE LIGHTING
- 100% SHUT OFF SAFETY
- 100% AUTOMATIC CONVENIENCE
- Only ONE Unit to Buy, Stock, Install
- Cuts Factory Assembly Time
- Simplifies Field Installation
- Saves Gas Control Costs
- Operates Quietly
- Helps You to Better Styling
- Provides Proven DEPENDABILITY
- A.G.A. Approved
- Capacity

70,000 B.T.U. on gases less than 800 B.T.U. per cu. ft.
100,000 B.T.U. on gases more than 800 B.T.U. per cu. ft.

AUTOMATIC PRODUCTS COMPANY
2452 NORTH THIRTY-SECOND STREET
MILWAUKEE 10, WISCONSIN

WRITE for the whole profitable story of A-P GASAPACK, the "ONE DOES ALL" Gas Control for today's and tomorrow's finest gas heating appliances.

Millions Know the Satisfaction of

AP DEPENDABLE Controls

FOR HEATING • AIR CONDITIONING • REFRIGERATION

THESE COPPER-BEARING STEEL SHEETS

LAST CONSIDERABLY LONGER

(and cost very little more than ordinary galvanized sheets)

Heating or ventilating ducts made from Beth-Cu-Loy Galvanized Sheets can be expected to last longer than those made from plain galvanized steel sheets.

The principal reason for this long service is the resistance to rust provided by Beth-Cu-Loy's copper-bearing steel base. It is manufactured from open-hearth steel that contains 0.20 to 0.30 pct copper. In atmospheric-exposure tests by the American Society for Testing Materials this composition has proved to have more than double the resistance to corrosion found in ordinary open-hearth steel.

Aside from their lasting qualities, Beth-Cu-Loy Sheets are easy to form, to seam and to solder. They make fast work of difficult jobs. Their very slight additional cost is balanced many times over by their longer life and excellent workability.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
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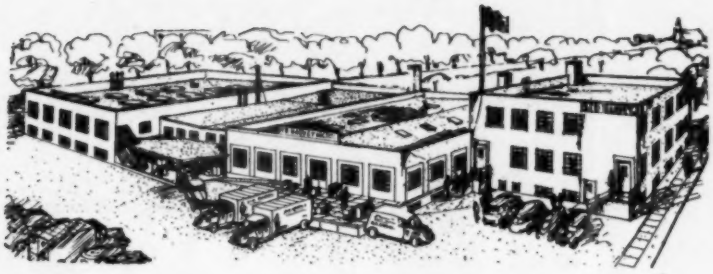
Beth-Cu-Loy Galvanized Sheets

BETHLEHEM STEEL



BROTHER, WHAT A SUPPLY HOUSE

They've got EVERYTHING — Plus Distribution through YOUR supply house. If you service all makes of oil burners, you need Sid Harvey's:

IMMEDIATE EXCHANGE of all makes — of all kinds of defective oil burner parts.

SEALED CARTONS for Sid Harvey rebuilt Pumps, Relays and Controls.

MODERNIZING PACKAGES for obsolete and non-standard burners.

SERVICE PACKAGES to give greater coverage with less car stock and service parts, tools and supplies galore.

Now Available At Any Recognized Jobber

If your favorite supply house does not have the Sid Harvey Line now, ask him to get it for you.

DO YOU HAVE YOUR COPY of the new Sid Harvey Catalog?

Write for it, on your letterhead only.

Sid Harvey Rebuilding Service covers over 1,000 different makes and models of oil burner parts. A huge stock of rebuilt items means immediate exchange and no waiting.

Don't pass up obsolete or non-standard burners because you can't get parts. Sid Harvey lists 175 Modernizing Packages to enable you to take care of this work.

Every Sid Harvey rebuilt part carries the same guarantee as a new one. Sid Harvey's rebuilt pumps, relays and controls come to you in sealed cartons, plainly labeled—so you can deliver them fresh to your customers.

Your biggest service expense is your serviceman's time. Sid Harvey Service Packages enable him to carry the essential parts to complete 90% of his calls the first trip. Your investment in parts is kept at a minimum, too.

SID HARVEY ASSOCIATED COMPANIES:
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PHILADELPHIA, PA.; WASHINGTON, D. C.; BALTIMORE, MD.

SID HARVEY INC.
VALLEY STREAM, NEW YORK

JAMAICA • NEW ROCHELLE • BRIDGEPORT

"the new

royal jet-flow

has increased my profits 41%

...it is the easiest to sell...

easiest to install of any full size

heating unit on the market."

This is a typical report from a

satisfied Jet-Flow dealer.

Dealerships are open in certain

areas. If you want to increase

your profits with this inexpensive

gas-fired heating unit we

suggest you write, or phone us

collect for complete information.

phone CUmberland 32117

royal heaters, inc.

Alhambra, Calif.

Royal Jet-Flow comes complete in one package—can be painted or papered. Gives forced air performance—yet costs no more installed than an ordinary floor furnace.

over 50,000 royal jet-flows installed in houses built by america's largest builders

Letters from some of the largest builders with hundreds of Jet-Flows installed are sound proof of the exceptional qualities of the unit.

"...Royal Jet-Flow is the perfect answer for modern homes" **Fritz Burns, Kaiser Community Homes.** "...a remarkable development in home heating...giving the small home owner the type of heat heretofore available only in a high cost home" **M. J. Brock, M. J. Brock & Sons, Inc.** "...this superior heating equipment places us at a distinct advantage in today's competitive market" **J. R. Ashton, Del E. Webb Construction Co.**

Standardize on self-aligning, self-lubricating *economical* Randall Pillow Blocks . . . for every air handling need

You make sure of smooth, quiet operation for the life of the equipment when you specify Randall Pillow Blocks. Only Randalls have self-lubricating, graphited phospher bronze or sintered bronze bushings in self-aligning, wool-felt-packed oil reservoir housings.

You can afford Randall quality. The Randall Line is complete. You select the type and size that's exactly right for the job. Write for Catalog 49, with complete data.

STREAMLINED
ONE PIECE STEEL
HOUSING PILLOW BLOCK

RANDALL GRAPHITE BEARINGS, INC.

609 West Lake Street, Dept. 1111, Chicago 6, Illinois

REPRESENTATIVES CARRYING STOCKS

THE BROWN BEARINGS COMPANY
Portland 9, Seattle 4

THE BERRY BEARING COMPANY
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ALLEN P. JAMES COMPANY
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EDWARD D. MALTBY COMPANY, INC.
Los Angeles 15, San Diego, Phoenix, Honolulu

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SYRACUSE BEARING COMPANY
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SALT LAKE HARDWARE COMPANY
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DOMINION BEARINGS, LTD.
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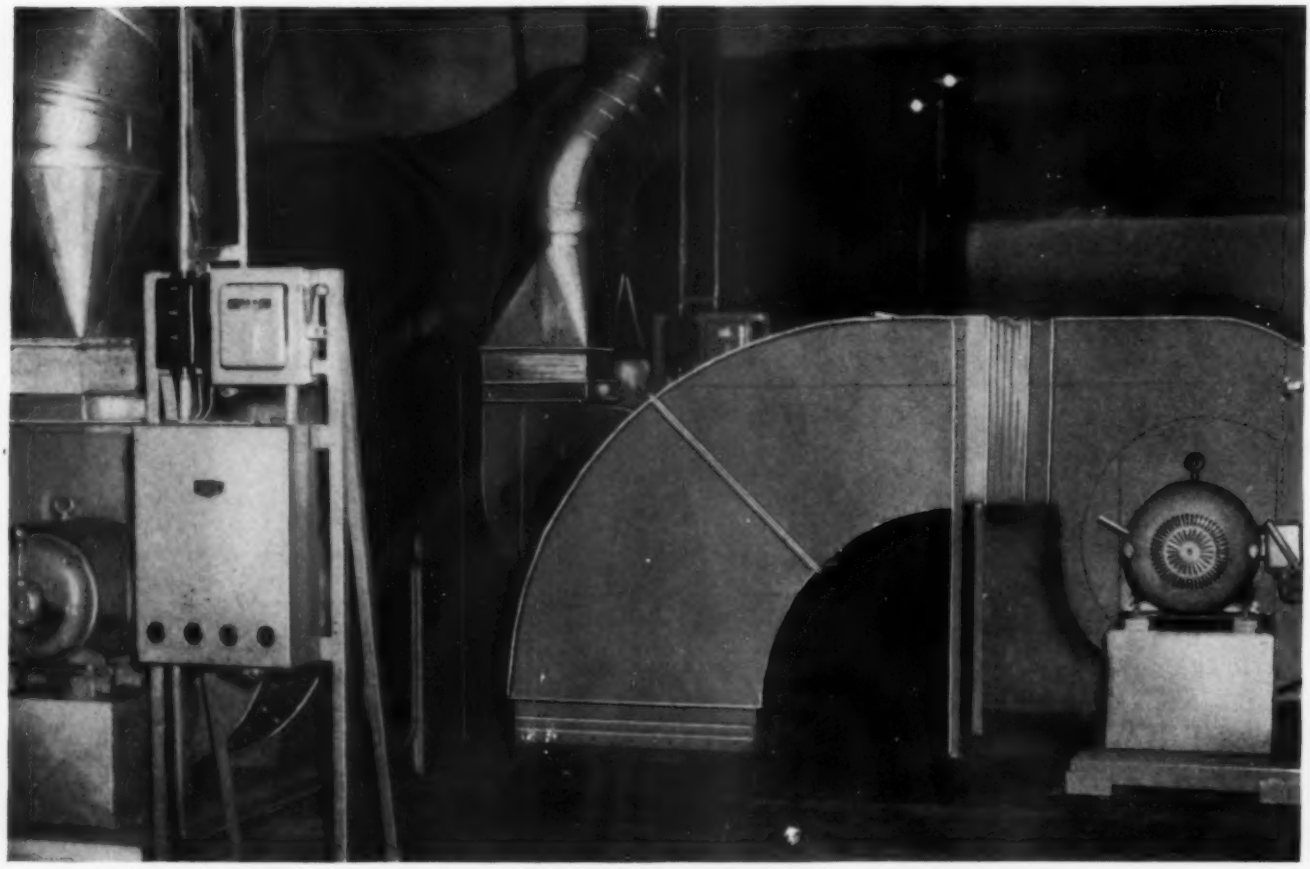
CUBA

GOYANEZ y ALVAREZ
Havana

"LL"—THE FANS YOU CAN'T OVERLOAD



Regardless of duct length or other resistance, the Limit-Load characteristic of these "Buffalo" Fans means no overload or motor burnout. You can pick your motor close to rated capacity.

And that's just one of many "Buffalo" features appreciated by contractor and user alike. *The "LL" is a good fan to install*—it's made in the arrangements, sizes and discharge angles to fit your job. It's quiet and efficient—it's improved blade and scroll design, plus inlet guide vanes give air a *smooth* passage. *And "Buffalo" Limit-Load Fans are safe fans to install* because their performance is backed by over seventy-one years of experience by "Buffalo".

WRITE FOR YOUR FREE COPY!
Bulletin 3675 gives you useful information about construction, sizes, installation data, etc. on "Buffalo" Limit-Load Fans.

A "Must" For Every Engineer!
FAN ENGINEERING, 5th Edition, offers you 808 pages of latest facts on air problems, including: fans, air flow, sound laws, heat, cooling, drying, air properties, humidity, air conditioning.

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"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

504 BROADWAY BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Branch offices in all Principal Cities

VENTILATING FORCED DRAFT | AIR WASHING COOLING | AIR TEMPERING HEATING | INDUCED DRAFT EXHAUSTING PRESSURE BLOWING

Lima

"WORLD'S FINEST REGISTER"

Eliminates Quadrant Dampers . . . Lets Homeowner Balance His Own Heating System!

ONE MAN can balance a heating system using this revolutionary register, in ***less time*** than two or more men with conventional registers! The exclusive Lima "Balancing Bell" control makes this heating miracle possible. ***No quadrant dampers*** are needed. The ***homeowner*** can readjust the system to suit his needs, without ever having to call in for service! New manufacturing processes enable you to install this new register at competitive prices, too! ***Send TODAY for free descriptive brochure!***

PIANO TYPE STEEL SPRINGS
Strong and durable. Afford perfect valve control.

"Balancing Bell"* CONTROL
Perfect finger-tip heat control. Does work of quadrant valves.

SPONGE-RUBBER SEALED
Gives absolute sealing when set in place.

SMOOTH ONE-PIECE HORIZONTAL LOUVERS
Streamlined appearance. No center band to resist air flow.

HIDDEN RESISTANCE-WELDED VERTICAL BLADES
Give perfect air diffusion; eliminate drafts.

HEAVILY DIE-FORMED VALVE
Closes tightly, never leaks, never "whistles."

Electrostatically PAINTED
Finest finishing method known. Paint clings to all parts.

ORDERS FILLED COMPLETELY FROM STOCK WITHIN 5 DAYS OR LESS!

THE Lima REGISTER COMPANY
LIMA, OHIO

*Patent applied for

SEND COUPON TODAY For FREE Descriptive Brochure!

LIMA REGISTER COMPANY
651 N. Baxter Street, Lima, Ohio

Gentlemen:
Please send me free descriptive brochure on the complete line of Lima registers and faces for installation in walls, baseboards and floors.

NAME _____

ADDRESS _____

CITY _____ *ZONE* _____ *STATE* _____

Reliability plus Road-Ability . . .

CHEVROLET ADVANCE-DESIGN TRUCKS

CHEVROLET **Chevrolet Advance-Design trucks have what it takes to deliver your goods swiftly, safely, surely—under the most adverse driving conditions. They thrive on rough going—perform reliably, efficiently, economically on America's most rugged roads. What's more, wise truck buyers recognize that only Chevrolet trucks give them sensational 3-WAY THRIFT—lower cost operation, lower cost up-keep and lowest list prices. This unsurpassed combination of thrift plus performance makes Chevrolet Advance-Design trucks top favorites across the nation . . . outselling the next two makes combined. For further details see your Chevrolet dealer without delay.**

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

TOP-VOLUME PRODUCTION BRINGS YOU TOP-VALUE FEATURES!

Chevrolet's new 4-SPEED SYNCHRO-MESH TRANSMISSION offers quicker, quieter and easier operation. Double clutching is eliminated. Faster shifting maintains speed and momentum on grades. Available in series 3800 and heavier duty models.

Chevrolet's power-packed VALVE-IN-HEAD ENGINES provide improved durability and efficiency as well as world-famous economy!

Chevrolet trucks have the famous CAB THAT "BREATHES"*! Outside air is drawn in and used air forced out! Heated in cold weather.

Chevrolet Advance-Design brings you the FLEXI-MOUNTED CAB, cushioned on rubber against road shocks, torsion and vibration.

Chevrolet's exclusive SPLINED REAR AXLE HUB CONNECTION adds greater strength and durability to heavy-duty models.

Uniweld, all-steel Cab Construction • Large, Durable, Fully-Adjustable Seat • All-Round Visibility with Rear-Corner Windows* • Heavier Springs • Super-Strength Frames • Full-Floating Hypoid Rear Axle in the 3600 Series and Heavier Duty Models • Double-Articulated Brake Shoe Linkage • Hydrovac Power Brakes in Series 5000 and 6000 Models • Many Color Options.

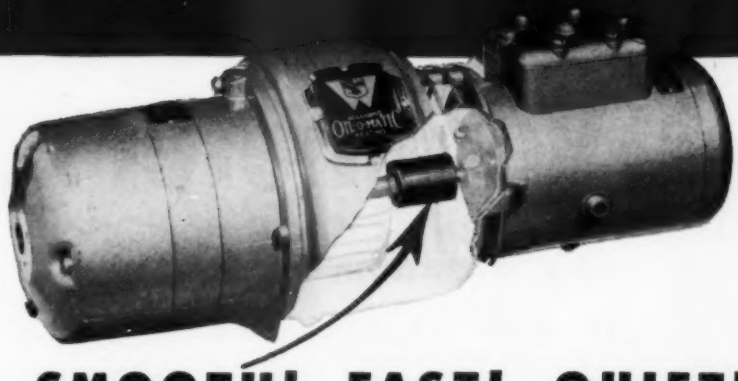
**Heating and ventilating system and rear-corner windows with de luxe equipment optional at extra cost.*

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!

CHECK THE FACTS

and you will find
WILLIAMS OIL-O-MATIC is easier to SELL
than to SELL AGAINST

THE AMAZING
OIL-O-MATIC
Cushion Coupling



SMOOTH! FAST! QUIET!

Engineering genius developed this small but important feature . . .

The new Cushion Coupling connects the 3450 rpm Capacitor-Start Motor to the Sealed Thrift Unit . . . it's especially designed for vibrationless, positive transmission of motor power, self aligning, self adjusting. No set screws.

INSTANT RESPONSE! SILENT EFFICIENCY!

Prospective customers like the Cushion Coupling . . . and the many other features of Oil-O-Matic's Model Fifty-Ten Low Pressure Burner. In competitive selling it's better to have Oil-O-Matic's features in your favor.

Make sure Oil-O-Matic is on your side of the sale!

NOW
SOME ONE
EVERY OIL-O-MATIC
DEALER HAVE THE
INDUSTRY'S BEST
FRANCHISE

NEW COMPLETE UNITS

for warm air, steam, or hot water. Featuring Model Fifty-Ten performance.

A FEW DEALER TERRITORIES

are available in our expanding dealer organization. Write Factory today for all facts.

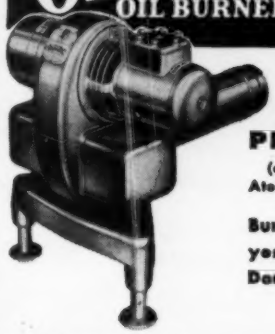
WILLIAMS OIL-O-MATIC DIVISION

EUREKA WILLIAMS CORP. • BLOOMINGTON, ILLINOIS

in the New *All* New

MODEL *Fifty-Ten*

WILLIAMS
OIL-O-MATIC
OIL BURNER



LOW PRESSURE
(only 1 to 2 lbs. Atomizing Pressure)

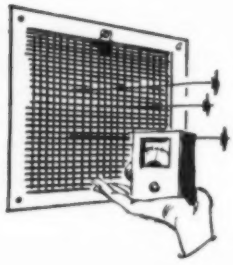
Burns any kind, yes, any kind of Domestic Fuel Oil

PITTSBURGH Testing Laboratory tests have proved Oil-O-Matic's ability to burn either a No. 1 Oil or a 100% catalytically cracked oil with equal ease and efficiency.

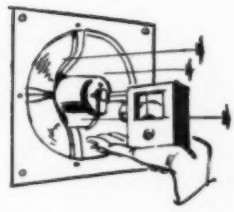
FEATURES FOR SERVICE!
FEATURES FOR SALES!
FEATURES FOR SATISFACTION!

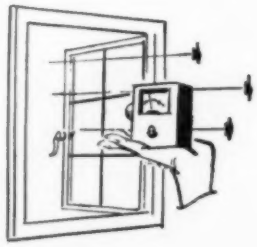
- ***NEW*** **Vair-O-Meter Blower**
- ***NEW*** **Hydraulic Shut-Off Valve**
- ***NEW*** **$5,000,000 Oil-Air Nozzle**
- ***NEW*** **Capacitor-Start Motor**
- ***NEW*** **Cushion Coupling**
- ***NEW*** **Sealed Thrift Unit**

Fastest



Surest way to check Air velocities





Only $33.00
F. O. B. Factory

Handsome Genuine Leather Case
Available for Only $4.00

Velometer Jr.

FOR BALANCING AIR SUPPLY
IN NEW OR EXISTING SYSTEMS

Here's the way to take the guesswork out of the job of balancing systems and to speed up the adjustment of any air conditioning, heating, and/or ventilating set-up. It's the Alnor Velometer Jr., the miniature, direct-reading air-velocity meter—a handy low-cost instrument for instantaneous and precise measurement of air velocities in unrestricted areas. Only 4 inches high, 3 inches wide, 1½ inches deep, Velometer Jr. is precisely built for accurate performance—with double pivoted, double jeweled movement, air-actuated pointer vane, and sturdy, handsome, molded bakelite case. Available with single or double velocity range scales, Velometer Jr. can be one of your most useful tools for years to come.

NOW IS THE TIME . . .

Order your Velometer Jr. today while you are thinking about it. And send for Bulletin which gives complete details. Use the handy coupon!

ILLINOIS TESTING LABORATORIES, INC.
Room 538, 420 N. LaSalle St.
Chicago 10, Illinois

Enclosed find check for $.....to cover purchase of.....
Velometer Jr. and.....carrying case.

☐ Please send latest bulletin.

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Address.....

City.....Zone.....State.....

ILLINOIS TESTING LABORATORIES, INC.
Chicago 10, Ill.

Alnor

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

"Sunny—it's cold outside..."

MOR-SUN
WARM AIR FURNACES
Forced Air and Gravity
for Gas and Oil

Speak of the Devil . . .

Allow me to introduce myself . . . I am a visiting expert on—ah—space heating . . . dropped in to look over this MOR-SUN.
Word gets around, you know.

If you'll excuse the expression — What the devil do you want with a MOR-SUN . . . I mean, considering where you're from?

Purely an urge to modernize, my boy —what with all the coal strikes, stokers' union and what have you . . . Primarily, I'm interested in B. T. U.'s — real heat!

Then your best bet's a MOR-SUN! Its heat exchanger gives out-of-this-world efficiency . . . no other heat exchanger produces as much heat from a given unit of fuel!

It sounds dreadfully expensive, and we haven't much of the long green . . . you know — that stuff about not being able to take it with you? It's so true!

Lucky Devil! You came to the right man . . . The MOR-SUN is as inexpensive to buy as it is to operate! That's because it's MASS PRODUCED! . . . a product of the same assembly-line production as today's automobile!

It also adds Beauty to your — er — Basement ... but I don't suppose you're interested in that.

Ah, it is beautiful! But tell me—will it stand the gaff?

It's all 12-gauge steel! . . . a wholly post-war product of the latest techniques in die stamping!

I'm sold! Now you're in an unusual position . . . you'll have to tell the Devil where to go!

There are Morrison representatives all over the country, sir, or you can write to Morrison Steel Products directly!

Thank you, son. Look me up if you ever go to . . . er, g'bye . . . I hope.

MOR-SUN
PRESSED STEEL FURNACES

"The Sun Never Sets with Mor-Sun"

MORRISON

STEEL PRODUCTS, INC. • BUFFALO 7, N. Y.

You get — COMPLETENESS AND DEPENDABILITY WITH Profit

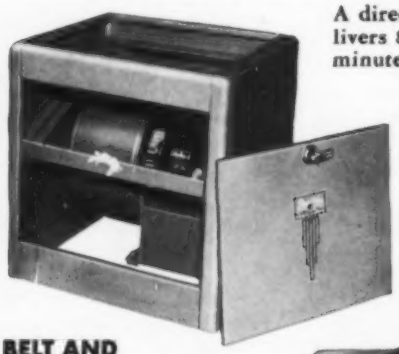
IN Peerless-Electric

PACKAGE UNITS AND BLOWERS

● Peerless Electric blowers and package units are manufactured *complete* in the Peerless plant. Peerless is *not* an assembled line.

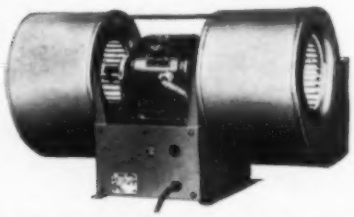
Peerless equipment is *dependable*—you minimize service worries because Peerless equipment is designed and engineered from 56 years experience in producing quality electrical apparatus. And you'll find that Peerless blowers and package units are priced right to earn a profit for you. Write for detailed information.

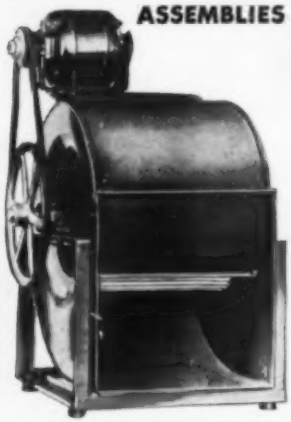
PEERLESS ELECTRIC AIRBOY BLOWER ASSEMBLY



A direct drive blower that delivers 850 cubic feet of air per minute. 3-speed blower with motor blower unit rubber cushioned. Blower wheel dynamically and statically balanced. The two motor bearings are the only bearings in the unit. Also supplied with cabinet and air filters as a complete package unit.

BELT AND DIRECT DRIVE BLOWER ASSEMBLIES





You'll find Peerless blower assemblies in many nationally-sold air conditioning furnaces of the finest quality. We furnish both of these assemblies ready to install in your own furnaces or cabinets. The many fine construction qualities of these blowers add valuable sales features to your heating units.

THE PEERLESS ELECTRIC COMPANY
ESTABLISHED 1893 • WARREN, OHIO

Peerless-Electric
MOTORS • FANS • BLOWERS

NEW LITERATURE

Use Coupon on Page 111

Heating System Accessories 326

A complete line of registers, grilles, and furnace accessories for gravity and air conditioning systems is described in a convenient 40 page pocket-size catalog. All of the items described in this guide are clearly illustrated. In addition, complete lists of sizes, prices, and general data are set up in handy tabular form.

Hart & Cooley Manufacturing Co., Holland, Mich.

Aluminum Shade Screening 327

Data book on Kaiser aluminum shade screening contains technical information as well as explanations of the advantages of the screening, all of which can be used as sales aids. Among these advantages are said to be low cost and greater heat load reduction than can be achieved with more expensive materials. The screening is recommended as durable, and easily installed and maintained as a year around fixture.

Permanente Products Co., Oakland 12, Calif.

Air Diffusers 328

Bulletin 28 is a four page folder that explains the operation and application of air diffusers for projection unit heaters. Amply illustrated, the folder shows how the air diffusers are used on vertical-discharge unit heaters for installations 10 to 30 ft above the floor, where heated air is directed straight down in order to reach floor level.

Illustrations of the diffusers attached to nine different unit heaters of well-known make are included, and all dimensional data for air diffusers in 11 sizes are given.

Anemostat Corporation of America, New York, N. Y.

Residential Heating Units 329

Furnaces illustrated in an eight page catalog include winter air conditioners, gas or oil fired; modern cast iron coal or gas furnaces; and all-steel gravity and forced air coal furnaces. Features and specifications are given for each model of these residential heating units.

American Furnace & Foundry Co., Milan, Mich.

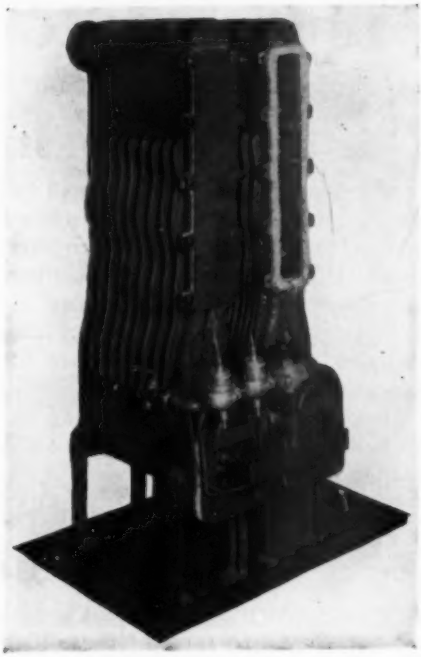
Metal Treating Chemicals 330

Folder entitled Surface Facts about Metal discusses uses of metal protecting chemicals, including Deoxidine, Rodine, Granodine, Duridine, Alodine, Thermoil-Granadine, and Lithoform, among others.

Process chart clearly illustrates the process, method of application, and equipment to be used with each chemical on steel, aluminum, zinc, galvanized iron, cadmium plate, brass, copper, and terne-plate.

American Chemical Paint Co., Ambler, Pa.

built to last . . . . .



Illustrated above is the Monocast Cast-Iron Heat Exchanger — the heart of Gasmaster units. (Right view, inspection plate removed.)

Commercial Units

Furnaces with greater Btu input rating—for use in commercial buildings, etc., can be supplied on request. Range from 50,000 to 1,000,000 Btu. Gasmaster design permits addition of heat exchangers to meet larger output requirements.

Write for descriptive literature and prices on the Gasmaster Conversion Burner. A.G.A. approved to 200,000 BTU input.

The New

GASMASTER

GAS FIRED WINTER

AIR CONDITIONER

Direct from Factory to Dealer

These highly efficient units are built around the Monocast-Cast-iron Heat Exchanger which is scientifically designed and constructed to produce an abundance of heating surface, extra long fire travel, and the correct wiping action of air over the entire outside surface of the heating element, creating a high standard of efficiency in the operation of the unit. For ease of servicing a clean out plate is located on the exchanger.

The cast iron heating element permits an unusual standard of performance, eliminates expansion and contraction noises, and retains enough heat to carry over from one burner operation to another. This also provides more even heat throughout the home resulting in absolute proof of a well designed, efficient installation and consequent customer recommendations for you.

The **GASMASTER** line is available in five sizes from 50,000 to 200,000 Btu for use on practically any type of installation. Check over the units shown here and then write us for more descriptive information. A postcard will do the trick!

TWIN CITY GAS SPECIALTY CO.

Manufacturers

710 WEST 27th STREET

MINNEAPOLIS 8, MINNESOTA

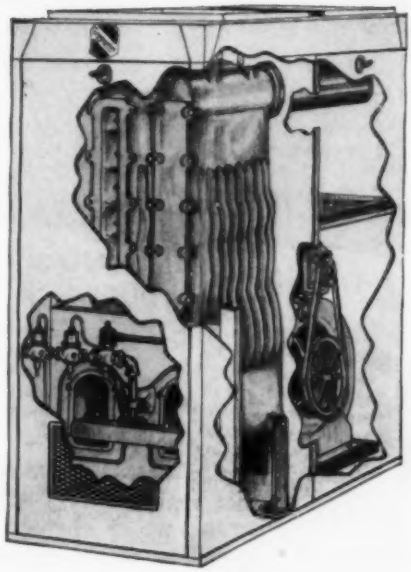
GASMASTER WINTER AIR CONDITIONER

Models 903-904 are A.G.A approved for Natural, Mixed, Mfd., L.P. and L.P. Air gases —100,000 Input.

No cracking or creaking due to expansion and contraction. Because of the large cast iron exchangers, a smooth almost flat heat curve is obtained. Two and three fan operations per cycle of the gas burner are attained regularly.

Units are equipped with Minneapolis-Honeywell solenoid or diaphragm gas valves as standard. Basso pilotstats and burners.

All controls are enclosed.



NEW LITERATURE

Use Coupon on Page 111

Packaged Control System.....331

Magic Dial control system for heating, cooling, and ventilating is discussed and illustrated in catalog sheets. Basic instruments consist of modulating motorized valve, modulating damper motor, remote bulb temperature control, room thermostat (modulating), cooling thermostat to operate liquid solenoid, surface acquastat, control cabinet, and time clock. Additional items are available as optional equipment.

In addition to description of operation of the units and price information, the sheets include wiring diagram for the system. Special feature is the use of Magic Wire, numbered for easy installation.

Midwest Automatic, 510 Third St., Des Moines, Iowa.

Drill Bit Chart 332

Small, quick reference chart which enables construction workers, installation and maintenance men, and electricians to determine instantly the correct size concrete drill bit to use for any given size of pipe, conduit, machine bolt, or concrete anchor has just been issued.

To use the chart it is necessary merely to locate the diameter of pipe, etc., to be installed. Correct size drill bit appears directly opposite. Procedure may be also be reversed to find correct diameter pipe for which a drill of given size may be used.

Chart is made of material designed to withstand hard usage. May be used as wall chart or carried on jobs.

Tilden Tool Manufacturing Co., Pasadena 3, Calif.

Packaged Incinerator 333

Descriptive literature is available on a packaged incinerator for residential installation. Unit is offered in three models, all of which are shipped knocked down for easy assembly by the purchaser. Specifications and prices are listed for each model. Also included are several illustrations from the step-by-step assembly and installation instructions which are included with each packaged little-Cinerator.

Accessories and quick drying paint for finishing the incinerator to match any decorative scheme are also available from the manufacturer.

The Clear Mfg. Co., 4525 N. 124th St., Butler, Wis.

High Speed Shears.....334

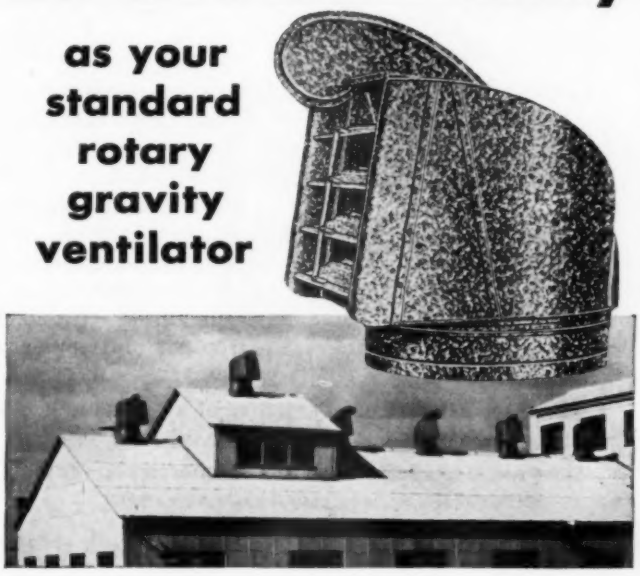
A line of power shears for light gauge metal is described in Bulletin No. 71-I. All features of these high speed shears, Series P, are listed and specification table is given for each model shear. In addition, back cover illustrates convenient back, front, and side gauges to be used for various cutting operations.

Niagara Machine & Tool Works, Buffalo 11, N. Y.

The Customer Always Returns
General
FUEL OIL FILTER
DE LUXE MODEL
2A-300
Model 2A-300 for exceptionally dirty tanks and large furnaces and boilers. 9-1/16" high, 5-1/2" diameter, 3/8" pipe openings.
General
FUEL OIL FILTER
STANDARD MODEL
1A-25
Model 1A-25 for space heaters, hot water heaters and small furnaces. 4-3/4" high; 3-1/2" diameter. Same style but with double capacity available as Model 2A-700.
FOR YOUR PASSENGER CAR OR TRUCK
General Filters are now available for your car or truck. Cartridges changed in one minute without tools. Complete kits include brackets for either engine or dash mounting. Put one on your car and truck. Regular dealer discounts.
You can be sure of repeaters when you sell a General Filter because the customer is always pleased with his money saving investment. So pleased, that it is natural for him to return year after year for a new cartridge. And your profit doesn't stop at the initial sale; it goes on and on with only a minimum of service from you.
A General Filter on every fuel oil burning installation is a good deal for both you and your customer — you make a nice profit on every sale and your customer is saved annoyance and expense from clogged burners.
MORE THAN 1600 JOBBERS TO SERVE YOU
GENERAL FUEL OIL FILTER

It pays you to sell the *Swartwout Rotary*

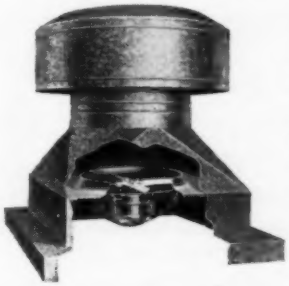
as your standard rotary gravity ventilator



The Swartwout name is known everywhere for *highest quality* in Roof Ventilators. The Rotary has been a favorite with industry and the heating and ventilating trade for over 40 years. You can use it in hundreds of places for efficient dependable ventilation. Its design permits unhampered air-flow and greatest capacity per size of roof opening. It's made in 14 throat sizes, from 12" to 72." Bases available for any type of roof. If you don't have the Swartwout general catalog write for Bulletin 335.

Recommend Swartwout VALVENT for Powered Stationary Jobs

Here's a popular type for many industrial and commercial installations. Made in 5 throat diameters—12, 18, 24, 30 and 36 inches, with capacities from 630 cfm to 25,700 cfm. Sturdy construction; pleasing appearance; efficient air-flow design; unique double cone damper and air-stream guide. Simple damper chain lock permits any degree of opening. Bases available to fit any type of roof. Also made without fan, for gravity ventilation. Write for Bulletin 337.



The Swartwout Company
18615 EUCLID AVE. • CLEVELAND 12, OHIO

Swartwout *Controlled* **Air Circulation**
EQUIPMENT FOR EFFECTIVE ECONOMICAL VENTILATION OF INDUSTRIAL BUILDINGS

NOW . . .
a TRULY Forced Air
INN-A-WALL

. . . and you can employ duct work where necessary!

SECURITY

Yes, sir . . . here is the answer to heating properly small homes without basements. Security's INN-A-WALL is an entirely new principle in forced air heating! Requires minimum duct work . . . may be used without ducts. Needs only 16 by 20-inch floor area.

The INN-A-WALL reverses the usual flow pattern . . . warm air comes out the *bottom*. This means *warm floors!* Warm air can be taken from all four sides . . . return air, from all sides at the top. Where ducts are required for distant rooms, permanent connection is made at the bottom. Completely assembled . . . ready to install. Casing height, 88 inches. Security breather tube automatically supplies air for combustion.

Other outstanding INN-A-WALL values are • Quiet, positive blower • Fully automatic • Special Security high-efficiency burners • Complete adaptability to any floor plan (may be placed in wall or stand alone) • Amazingly economical in price.

SECURITY
Automatic, Gas-Fired
INN-A-WALL FURNACE

Write Today . . .
don't delay. Get all the facts about this revolutionary new furnace.

SECURITY MANUFACTURING CO.
1630 Oakland St. Kansas City 3, Mo.

ABOVE ALL ELSE

A FURNACE IS ONLY AS TIGHT AND SAFE AS ITS "CEMENTED JOINTS!"

Grant Wilson's Asbestos Furnace Cement is manufactured under a special formula of long selected Canadian Asbestos Fibres and other binding materials. Its smooth texture trowels into joints binding the castings into a tight weld. It's fireproof and does not shrink, crack or crumble.

This unique Asbestos Furnace Cement grips the pores of cast iron or steel furnaces stopping unhealthy furnace gases from seeping through cracks, joints or seams; thus eliminating impurities and furnace soot from being carried through the air stream and distributed throughout the home. Grant Wilson's Asbestos Furnace Cement absorbs the expansion and contraction of the furnace castings.

Test its permanence and strength for yourself; use Grant Wilson's Asbestos Furnace Cement on your next job!

Write today for your free sample #11-A

GRANT WILSON, Inc.

Insist on it *Your Jobber has it*

141 W. JACKSON BLVD. CHICAGO 4, ILLINOIS

NEW LITERATURE

Use Coupon on Page 111

Air-Way Conditioners 335

Descriptive literature is available on a winter air conditioning unit being manufactured under the name of Air-Way. Units include both low boy and high boy models, featuring a heat exchanger which is standard for any type of installation. Complete specifications are given for heat exchanger, blower cabinet, and high boy blower. Burner employed is pressure atomizing gun type burner designed to provide efficient performance at low cost. It is flange mounted on a steel plate which is removable from front of unit for easy accessability.

Manufacturer stresses flexibility of all units and advantages of economical, maximum comfort.

Banquer Manufacturing Co., Dorchester 22, Mass.

Trunkline Fittings 336

Literature containing specifications on aluminum and galvanized Trunkline fittings is offered as catalog No. TF-448. Keyed layouts are included, showing the various fittings installed in round or rectangular systems. Each product is numbered and priced to facilitate ordering.

Norwalk Airconditioning Corp., South Norwalk, Conn.

Ventilator Data 337

A four page color booklet describes a full line of ventilators for all types of buildings. Large photographs of ventilators together with accompanying descriptive matter graphically illustrate uses of the units. Also included are capacity tables, working diagrams, and dimensional data charts showing relative sizes, and exhaust capacities for each piece of equipment.

Requests for catalog should be made directly to the manufacturer on company letterhead.

Penn Ventilating Co., Goodman & Allegheny Aves., Philadelphia 40, Pa.

Paint Spray System 338

Booklet of interest to users of industrial paint spray equipment has just been released. It describes a procedure which virtually eliminates installation of air cleaning equipment in spraying operations.

Basis of the system is a bank of washable filters whereby intake air can be cleaned and paint particles removed from the air by use of replacement type paint arrestor pads.

This eight page booklet also includes photographs and drawings of various applications.

Requests should be made directly to the manufacturer on company letterhead, asking for Form No. 1105.

Research Products Corp., Dept. LD, Madison, Wis.

WEATHER CONTROL OUTDOORS ?

WEATHER CONTROL INDOORS YES!

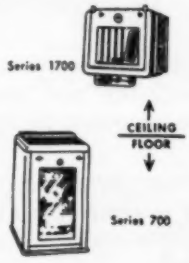
ONLY

THE Brundage AIR-RENEWER

PROVIDES COMPLETE WINTER and SUMMER AIR TREATMENT
MAINTAINS A CLEAN HOME . . . PROTECTS FURNISHINGS
GUARDS AGAINST THE COMMON COLD
MEANS EASIER BREATHING . . . REMOVES POLLEN
SUPPLIES ADEQUATE, TROUBLE-FREE HUMIDIFICATION

"Makes A Fine Day Every Day"

Scientifically correct combination of Chemistry and Electronics in one compact unit, automatically humidifies, cleans and purifies the air. The Brundage AIR-RENEWER can be installed with any type heating system (Warm Air, Steam, Hotwater, Radiant). It can also be used with any type cooling system. DON'T WAIT . . . Your Health and Home Demand It! See or Call—



DEALER NAME HERE

(Reduced from Actual Mat Size)

A MESSAGE TO OUR CUSTOMERS:

Ask for this newspaper ad which has been prepared for you. Use it in your newspapers to tell your customers about this new product which means home and health protection for them.

"Make Every Day a Sales Day"

Information available to others interested in this product

Brundage COMPANY

Blower Specialists Since 1919

612 NORTH PARK STREET
KALAMAZOO 11, MICHIGAN

ATTENTION!

manufacturers of

SPACE HEATING UNITS
AIR CONDITIONING EQUIPMENT
OIL BURNERS
STOKERS
GAS HEATING UNITS
HUMIDIFIERS

BUY THIS HARDWARE all from 1 source

AND BENEFIT FROM... **SIMPLIFIED CONTROL**
COMPLETE SELECTION... UNIFORM HIGH QUALITY
LOWER SHIPPING COSTS... PROMPT DELIVERY
SIMPLIFIED PURCHASING

FLAT AND ROUND HEAD
STOVE BOLTS
ROUND AND BINDER HEAD
SHEET METAL SCREWS
also
CATCHES
HINGES
HANDLES

WRITE US FOR FULL INFORMATION

NATIONAL LOCK COMPANY

ROCKFORD • ILLINOIS

CEILING SPACE NOW PAYS DIVIDENDS

WITH THE FAMOUS

Palmer

GAS FIRED

SUSPENDED HEATER

Distributors, dealers! Store owners, purchasing agents and architects all agree this is the finest, most efficient unit heater ever produced. Truly "the design of tomorrow."

PALMER is equipped with automatic controls and embodies exclusive high performance features. Customers receive "heating comfort plus" without so much as lifting a finger.

Yes, with a PALMER suspended heater, ceiling space now pays dividends in trouble-free heating efficiency, appearance and economy.

Dividend wise, PALMER will pay you *too* and many fold. Ordering a display stock now will soon prove it! There's a perfect model and size for every heating need. *Write for free literature today.* Dept. No. *A-2.*

PALMER MANUFACTURING CORPORATION

manufacturers of the famous Sno-Breze air coolers

PHOENIX, ARIZONA

SALES SENSE

By JACK BEDFORD

Thanksgiving is a good time for a salesman to sit down and consider just what he has to be thankful for—good health, membership in the greatest profession in the world, and plenty of good friends among his customers.

* * * * *

Salesman's Sage reported, "The difference between a groove and a grave is only a matter of depth."

* * * * *

When a salesman becomes content with himself his progress ceases. New prospects and more sales will overcome any contentment bothering a salesman . . . see new people and make more sales to erase contentment.

* * * * *

Sales Managers report that the world is full of willing salesmen—some willing to work, and the rest willing to let them.

* * * * *

Salesman's Sage said: "The stone that is fit for the wall does not long lie in the ditch."

* * * * *

Some salesmen live and learn . . . . . some just live.

* * * * *

Selling success is not found in wishing, but in doing —doing the best selling job every day and counting these successes as milestones to the end of the road.

* * * * *

When the going gets a little tough in selling it is good to remember this selling maxim: If things don't come your way—go after them.

* * * * *

Salesman Sam: Why do you have your arm in a sling? Break it?

Prospect Pete: Yes.

Sam: How did it happen? Accident?

Pete: No. I tried to pat myself on the back.

Sam: Why?

Pete: For minding my own business.

* * * * *

Temper is one thing that seems to improve the longer it is kept. Smart contractors hold their temper and so hold their business.

* * * * *

Salesman: I suppose you think I'm a perfect idiot.

Secretary: Oh no! Nobody is perfect.

* * * * *

Profits, not prophets, foretell the future; and good salesmen are the ones who foretell the profits.

* * * * *

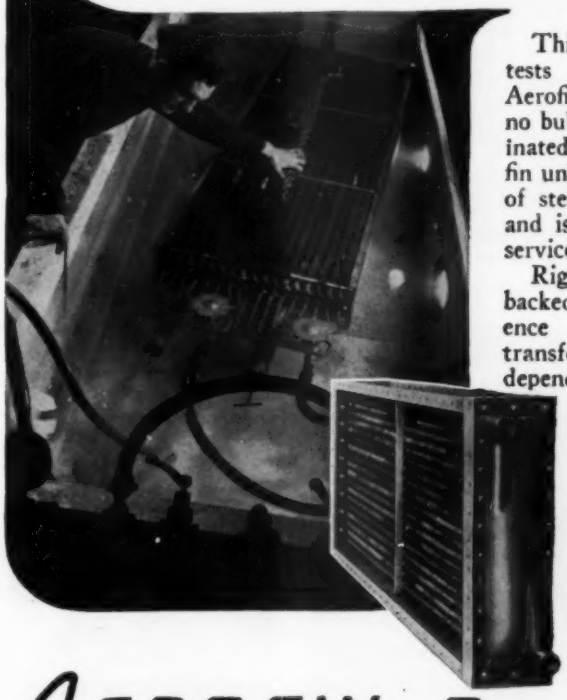
Salesman Sam was trying to get a little rest after contacting customers all day, but his young son kept up an endless stream of unanswerable questions.

"What do you do all day?" asked the boy.

"Nothing!" shouted Sam hoping that this would stop the questioning and let him read the paper.

After a few minutes pause his son asked, "Pop, how do you know when you're through?"

Here's the Story ON AEROFIN...



This air-pressure test is one of many tests used to control the quality of Aerofin finned heat-transfer surface. If no bubbles appear in the specially illuminated tank, it means the immersed Aerofin unit has withstood the terrific strains of steam and hydrostatic pressure tests and is ready to give you long, efficient service.

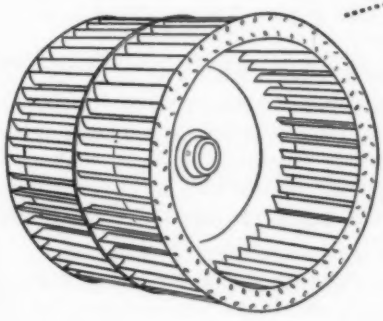
Rigid specifications and inspection, backed by more than 26 years of experience in manufacturing finned heat-transfer surface, assure you of Aerofin dependability, durability and efficiency.

Aerofin is devoted exclusively to the production of finned heat-transfer surface. This specialization enables Aerofin to select just the right surface and materials for the job, and to assemble these materials into a highly efficient unit.

Day after day, thousands of Aerofin Finned Heat-Transfer Units demonstrate their superiority under the most severe conditions. Complete research has developed accurate ratings which allow you to install Aerofin at full rated capacity with confidence.

AEROFIN CORPORATION

410 South Geddes St., Syracuse 1, N. Y.



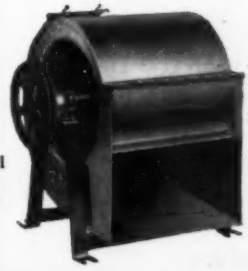
The Heart of the *Brundage BLOWER

...*the NEW Brundage Wheel!

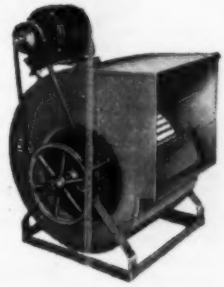
for performance, for quality, for strength of material, for method of construction, be sure it's a Brundage

WRITE FOR INFORMATION

Utility-Room Furnace Style



Conventional Furnace Adaptation



Evaporative Cooler Style

Brundage COMPANY

Blower Specialists Since 1919

612 NORTH PARK STREET
KALAMAZOO 11, MICHIGAN

JOHN ZINK

SHORT FLOOR FURNACE
ONLY 26" DEEP

— Two Sizes Available —

30,000 Btu ——— 50,000 Btu

AGA Approved for Natural, Manufactured and Liquefied Petroleum Gases

These new floor furnaces are especially designed for installation where underfloor space is limited. Being only 26" deep, they can be installed where foundations are extremely low, eliminating the necessity of making a pit.

•

CONVERSION BURNERS

TWO MODELS AVAILABLE

Luminous Flame Model Illustrated

LUMINOUS FLAME MODEL

Easy to install. Operates manually or automatically. Burns clean fuel—natural, mixed, manufactured or LP gases — without soot or smoke. Luminous flame radiates heat two to three times faster than a blue flame. Four sizes available for either vertical or horizontal firing.

BLUE FLAME MODEL

Designed to meet the requirements of this type of burner. Capacity range of 100,000 to 200,000 Btu/hr. for operation on natural, mixed or manufactured gases. Manual or automatic operation. Easy to install.

Write for Literature

John Zink Company

4401 South Peoria

TULSA, OKLAHOMA

New York — Salt Lake City — Houston — Los Angeles

INDUSTRY ITEMS

FRANK GIBBONS, sales manager of the Viking Air Conditioning Corporation of Cleveland announces additions to the sales staff of the corporation in two important territories. Robert R. Briggs has been appointed factory representative for the Michigan, northern Indiana, and northwestern Ohio territories and Jack Green has been appointed in a like capacity for the Cincinnati territory covering southern Ohio, eastern Indiana, eastern Kentucky and West Virginia. Both men will be calling on furnace manufacturers and jobbers with the Viking complete line.

R. R. Briggs

Jack Green

Mr. Briggs comes to Viking from the sales department of the Proctor and Gamble Company in Toledo. He attended Northwestern University School of Engineering and was for several years connected with the Fuel Oil Service department of the Standard Oil Company in Toledo. During the war Mr. Briggs was in the Navy as a flight engineer in the southern Pacific area. Mr. Briggs will be located in Toledo where he will live at 1216 Higley Street with his wife and two daughters.

Jack Green has been with Viking in various capacities for several years. Most recently he was with the advertising and sales promotion department. In this capacity, he did considerable work with dealers and jobbers on special promotion and advertising activities. Mr. Green will make his headquarters in Cincinnati.

HALL-NEAL FURNACE COMPANY, of Indianapolis, Indiana, has announced the appointment of the Breinholt Company, Salt Lake City, Utah, as inter-mountain distributors for the Victor heating equipment line.

The Victor Fin furnace line is complete. 19 models for coal, gas and oil furnaces are sized from small utility home to large plant requirements.

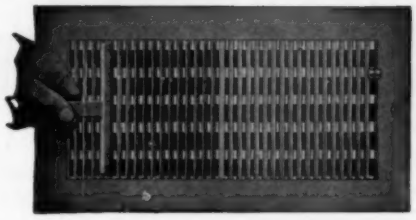
The Breinholt Company distributorship includes the entire state of Utah and parts of Oregon, Idaho, Wyoming and Colorado.

APPOINTMENT OF THE LUMBER & MILLWORK COMPANY of Baltimore, Maryland, as a distributor for oil burning furnaces and oil and gas water heaters have been announced by Duo-Therm division of Motor Wheel Corporation, Lansing, Michigan.

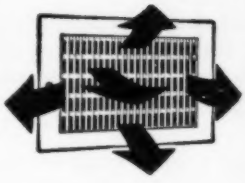
The Lumber & Millwork Company of Baltimore will handle distribution of the above Duo-Therm appliances in eight counties in Maryland.

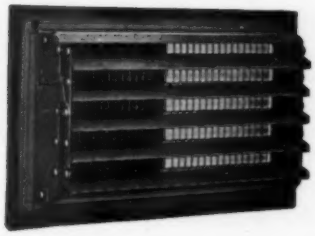
Independent

WROUGHT STEEL REGISTERS PROVIDE 4 WAY ADJUSTABLE AIR FLOW



Design No. 238





Right : : : left : : : up : : : down : : : air flow at any angle desired, in addition to straight outward . . . plus the durable construction which has distinguished Independent products for more than 46 years : : :

238 Independent Wall Register. Vertical grille bars are manufactured at an angle of 30 degrees, one-half to the right and one-half to the left. They may be bent to direct air flow at any other right or left angle or straight outward. Horizontal multiple valves located at the back of register can be set to deflect air flow up, down, or straight outward. Available in standard sizes 8″x6″ to 30″x8″.

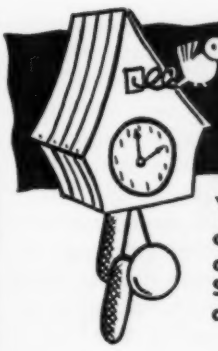
MEMBER NATIONAL WARM AIR HEATING INDOOR COMFORT AND AIR CONDITIONING ASSOCIATION

Send for New Catalog No. 48

Always Leading—Always Progressing

THE INDEPENDENT REGISTER CO.

3747 E. 93rd STREET · CLEVELAND, OHIO

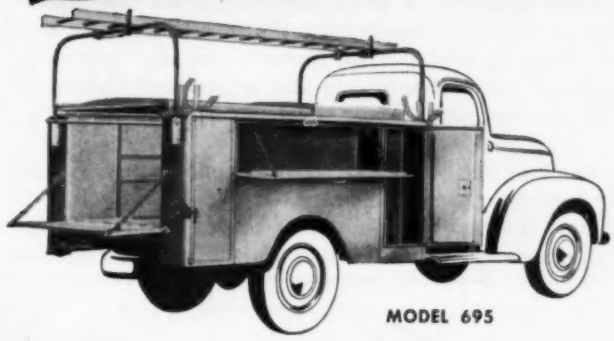


IT'S ABOUT TIME!

YES — **It's about time that someone designed a Service Body to cover the needs of the Furnace and Sheet Metal Man — Morrison has done it with the**

Carry-All

HERE 'TIS— A SERVICE BODY THAT WILL CARRY YOUR FURNACES AND SHEET METAL — WITH RACKS FOR LADDERS AND DOWN SPOUTING — WITH LOCK COMPARTMENTS FOR TOOLS, FURNACE SERVICE PARTS AND CONTROLS.



MODEL 695

The Morrison Utility Body is designed to fit any known chassis—and because of its rugged construction, it can be expected to outlive the original chassis.

All compartment doors are constructed of an inner and outer steel stamping securely welded together into a rigid unit and assembled into the body to insure a weatherproof closure.

Wise locks protect the contents of the side boxes—relocking without the use of key, automatically ejecting key in locked position; reversible keys and concentric tube mechanism withstand severe weather conditions and abuse.

The all-industry Morrison "CARRY-ALL" is carried in stock for immediate delivery to franchised chassis dealers by more than 50 established truck equipment distributors strategically located from coast to coast.

- Rugged all-steel construction.
- Fits any standard commercial ½, ¾ or 1 ton truck chassis.
- 48½" inside width—greater floor space.
- Underbody bridge-type construction.
- Lightweight — High Tensile Steel — 25% weight saving plus greater structural strength than ordinary steel — carries heavier loads.
- Offset-reinforced non-skid heavy-load floors.
- Reinforced stamped man-carrying top (optional).
- Weatherproof compartments.
- Extra roomy convenient side boxes for tools, parts, accessories.
- Bassick center control of single closure, dual-latch, paneled doors.
- Wise key-operated locks and handles.
- Interchangeable parts.
- Completely precision designed, engineered, tooled, die-stamped and assembled.
- Streamlined all-purpose bodies—for every type of sales and service.

MORRISON STEEL PRODUCTS, INC.

SERVICE UTILITY MORRISON

"Carry-All" Service Body Division

625 AMHERST STREET, BUFFALO 7, N. Y.

THE ESTABLISHMENT of authorized service stations in all principal cities to provide prompt, efficient servicing of Penn Automatic Controls has been announced.

All authorized service stations have been carefully selected, not only for their ability to meet Penn's requirements, but also for strategic location in relation to the service requirements of the area.

Service personnel in these authorized service stations are given an intensive course of factory training, instructed and supervised by Penn service experts. This specialized training course is based on the design, construction and operating characteristics of Penn controls, with special emphasis on the techniques and procedures of keeping controls operating at top efficiency, the required ability to diagnose difficulties quickly and effect necessary adjustments or repairs correctly. In addition, all stations are authorized to make immediate replacements under the terms of the Penn Warranty and also under the Penn Flat Price Replacement Plan.

As a part of the program, Penn engineers have devised and made available to these stations the Penn control analyzer, a panel containing all the instruments necessary for testing the electrical circuits of all Penn controls. This control analyzer takes the guess work out of servicing and helps speed the necessary adjustments, repair or replacement.

THE DAYTON SALES EXECUTIVES CLUB has just started its 1949-50 series of meetings under the direction of Robert A. Mayne, president of Mayne Products Company, Dayton, Ohio. Active in the sales executives organization for a number of years, Mr. Mayne was elected to its presidency in June.

Making "Better Salesmanship" the subject for the year's programs, Mr. Mayne has scheduled a group of outstanding speakers for the club's monthly meetings.

Mayne Products Company manufactures blowers for warm air furnaces.

R. A. Mayne

E. P. Short, Jr.

RUSSELL COOK, vice president in charge of sales, of the Thatcher Furnace Company, has just announced the appointment of Edwin P. Short, Jr., to the sales staff of Thatcher Furnace Company.

Mr. Short is a graduate of the School of Engineering, Princeton University. During the war he served three years with the United States Navy, a year of which was spent in the Pacific Area on Guam, Saipan, and Okinawa.

Mr. Short joins Thatcher as a sales trainee where, for a period of ten months, he will undergo extensive training in the sales, engineering, and production divi-

Equip with THERMO DRIP

FOOL PROOF AUTOMATIC HUMIDIFIER THAT LASTS LONGER

Thermo-Drip Humidifiers are made to give you years of trouble-free performance. Even with hardest water, Thermo-Drip stands the test with long life and few replacements.

Thermo-Drip pans are stainless steel, rust-resistant, corrosion-proof. This thin bare metal pan with only a thin film of water gives greater humidifying efficiency by heating and vaporizing the water much faster.

Thermo-Drip Humidifiers are the *adjustable* humidifier. An outside fingertip control gives every user precisely the amount of humidity desired.

These extra features are built into every Thermo-Drip Humidifier

- Drip Feed Principle creates balanced atmosphere
- Hot pan surface gives immediate vaporization.
- No stagnant pool of water stands in pan
- Fingertip adjustment for more or less humidity
- Easy to clean
- No electrolytic action
- Valve movements prevent clogging by lime
- Easy to install — fits all types of warm air furnaces

Write today for Free Catalog, Dept. A-11

AUTOMATIC HUMIDIFIER CO.
CEDAR FALLS, IOWA

If you need

REPAIR PARTS

in a hurry . . .

Try NORTHWESTERN *for*

ALL MAKES OF STOVE, FURNACE AND BOILER REPAIR PARTS

NORTHWESTERN

Stove Repair Co.

662 West Roosevelt Road Chicago 7, Ill.

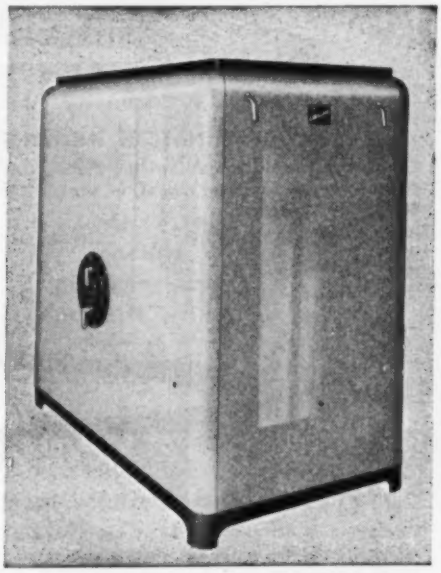
TJERNLUND

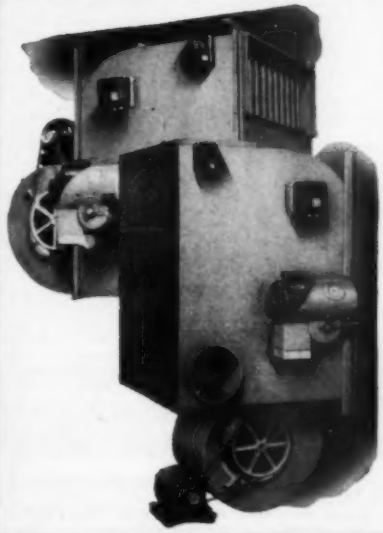
QUICK HEAT

DOMESTIC AND INDUSTRIAL

HEATING UNITS

EASIER SALES AND MORE SATISFIED CUSTOMERS





The variety of models to suit practically every heating purpose makes QUICK HEAT a recognized profit builder for warm air heating dealers. Practical application of sound engineering principles combined with extensive experience has produced this highly recognized line of superior equipment. Performance and convenience of these units proves business building quality to dealers handling this line.

Overhead Units For Ceiling or Wall Mounts

READY FOR INSTALLATION

Floor units are mounted on legs to prevent rusting of bottoms and eliminate air leaks. Factory assembled in attractive casing with new type heat saver and specially designed gun type oil burner. Convenient and quick installation.

Dealers:
WRITE FOR DESCRIPTIVE LITERATURE

TJERNLUND MFG. CO.
2140 Kasota Ave. St. Paul 8, Minn.

Good craftsmen are better with WISS Metal Snips!

WISS METAL-MASTER COMPOUND ACTION SNIPS

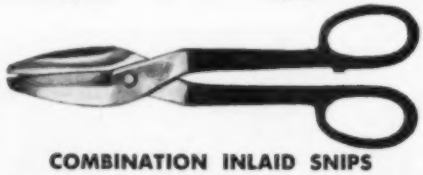
Compound leverage produces amazing cutting power with minimum effort. Set of 3 snips handles intricate jobs involving inside holes, circles, complicated patterns. Rubber grips recommended.

NO.	OVERALL LENGTH	LENGTH OF CUT	WT. EA.
M-1 (Cuts Left)	10 in.	1⅜ in.	12 ozs.
M-2 (Cuts Right)	10 in.	1⅜ in.	12 ozs.
M-3 (Cuts Straight and Curves)	10½ in.	2 in.	12 ozs.

STRAIGHT CUT INLAID SNIPS

Crucible steel inlaid blades. The basic snips for straight metal cutting. Gunmetal handles.

NO.	OVERALL LENGTH	LENGTH OF CUT	AV. WT. EA.
10	11½ in.	2½ in.	1½ lbs.
9	12½ in.	3 in.	2 lbs.
8	13¾ in.	3½ in.	2½ lbs.
7	14½ in.	4 in.	3 lbs.
6½	15¾ in.	4½ in.	3⅞ lbs.



COMBINATION INLAID SNIPS

Crucible steel inlaid blades. Straight blades, but ground and shaped so they cut curves, irregular shapes, or straight. The first choice of many sheet metal workers.

NO.	OVERALL LENGTH	LENGTH OF CUT	AV. WT. EA.
19	12½ in.	3 in.	1⅞ lbs.
18	13½ in.	3½ in.	2⅛ lbs.
17	14½ in.	4 in.	2⅞ lbs.

BULLDOG HEAVY-DUTY INLAID SNIPS

For cutting monel metal, stainless steel, Allegheny metal and all tough alloys. Invaluable for bench work in cutting strap iron bands. Cuts 18-gauge galvanized iron.

NO.	NAME	OVERALL LENGTH	LENGTH OF CUT	AV. WT. EA.
5	Bulldog	17 in.	2½ in.	3⅞ lbs.

BULLDOG COMBINATION STEEL SNIPS (not illustrated)

Moderately priced solid steel combination pattern for heavy duty work. Cuts curves and irregular shapes in the heavier metals. Short, powerful jaws and long handles give extra leverage.

NO.	OVERALL LENGTH	LENGTH OF CUT	WT. EA.
A-16	16 in.	3 in.	3¾ lbs.

Send for catalogue of complete line of metal cutting snips. 10 patterns, 24 sizes.

J. WISS & SONS CO.
Newark 7, N. J.

sions of the Thatcher Company. After this training program, Mr. Short will be assigned to a territory as a junior representative where, under the supervision of a senior representative, his training will be completed.

AT A RECENT DIRECTORS' MEETING, Robert C. Champlin, general manager of the J. L. Gillen Company, manufacturers of automatic gas and oil heating equipment was appointed vice president.

J. F. RAY, vice president in charge of sales, for the General Controls Company at Glendale, California, recently announced the opening of a new factory branch office in Cincinnati, Ohio, to service southern Ohio, southeastern Indiana and central Kentucky. This new office, located at 307 E. 4th Street in Cincinnati, will be headed by Jack Prutow, branch manager.

RANDALL GRAPHITE BEARINGS, Inc., which has been located in Chicago for over 30 years, has purchased the foundry and machine shop of Shook Bronze Corporation at Lima, Ohio. The foundry was thoroughly modernized in 1946. The machine shop is well equipped and will be augmented by a transfer, in due course, of the Randall Chicago plant to Lima. The Lima plant will be known as Randall Graphite Bearings, Inc., Shook Bronze division.

W. E. Dickerson, executive vice president, will remain in direct charge of the company's operations. K. E. Strunk will continue as production manager.

Randall's executive staff has been expanded by the addition of Alan Dale, formerly vice president and sales manager of Shook Bronze Corporation, as assistant to the president, Edward A. Zimmerman.

Statement of the Ownership, Management, Circulation, Etc., Required by Acts of Congress of August 24, 1912, and March 3, 1933

Of American Artisan, published monthly at Chicago, Ill., for Oct. 1, 1949.

State of Illinois, County of Cook—ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared F. P. Keeney, who, having been duly sworn according to law, deposes and says that he is the publisher of the American Artisan and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, and July 2, 1946 (embodied in section 537, Postal Laws and Regulations) printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—F. P. Keeney, Chicago, Illinois.
Editor—John E. Peterson, Chicago, Illinois.
Managing Editor—John E. Peterson, Chicago, Illinois.
Business Manager—Chas. E. Price, Chicago, Illinois.

2. That the owner is (if owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given):

Keeney Publishing Company, 6 North Michigan Avenue, Chicago 2, Illinois.

Stockholders: F. P. Keeney, Chicago, Illinois; W. J. Osborn, Fairfield, Conn.; Chas. E. Price, Chicago, Illinois; Robert A. Jack, Cleveland Heights, Ohio.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are (if there are none, so state):

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

F. P. KEENEY, Publisher.

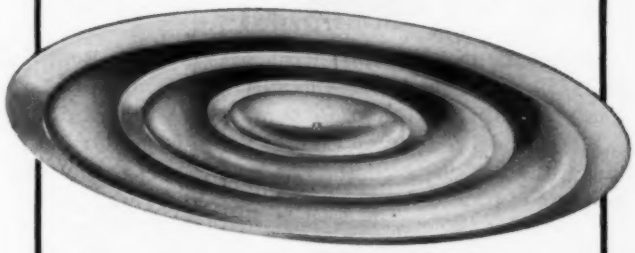
Sworn to and subscribed before me this 16th day of September, 1949.

GRACE E. WAYMIRE.

(My commission expires February 10, 1950.)

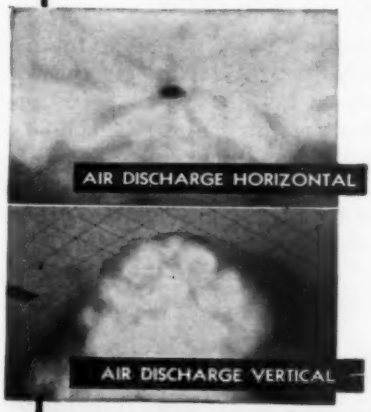
BARBER COLMAN

New!



Model "J"
CEILING OUTLETS

All the performance characteristics of previous designs—PLUS—ADJUSTABLE AIR PATTERN. The new Model "J" VENTURI-FLO Ceiling Outlets are engineered to exacting specifications for superior performance. Write for Bulletin F-4085 or see your Barber-Colman representative.



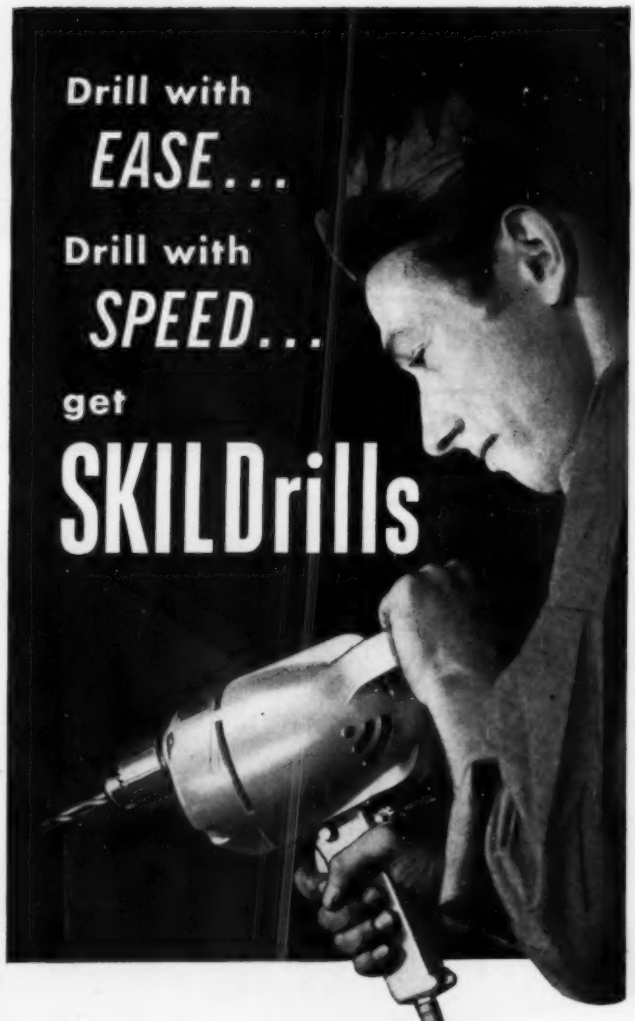
INTEGRAL PATTERN ADJUSTMENT

- LOW NOISE LEVEL
- LOW PRESSURE DROP
- ENGINEERED FOR COMFORT CONDITIONING
- FLUSH MOUNTING
- SUPPLY AND EXHAUST
- COMPLETE RANGE OF SIZES

BARBER-COLMAN COMPANY
1226 ROCK STREET • ROCKFORD, ILLINOIS

NATION-WIDE SALES AND ENGINEERING SERVICE

Drill with EASE...
Drill with SPEED...
get SKILDrills



Here's the easy solution to your cost and production problems. Get SKIL Drills! They're light, compact and perfectly balanced for sure, easy handling on the most exacting jobs. They work fast, drill clean. And SKIL Drills stand up better, last longer . . . because they're precision made with the finest gears, bearings, shafts and housings. Ask your SKIL Tool Distributor for a demonstration today. Choose from 26 powerful models.

Put SKIL Drills on those close-quarter jobs. They get in the smallest corners and turn out more holes in less time because they're extra compact AND extra powerful!

SKILSAW, INC.
5033 Elston Ave., Chicago 30, Ill.
Factory Branches in Principal Cities
In Canada: SKILTOOLS, LTD.
66 Portland St. Toronto, Ont.

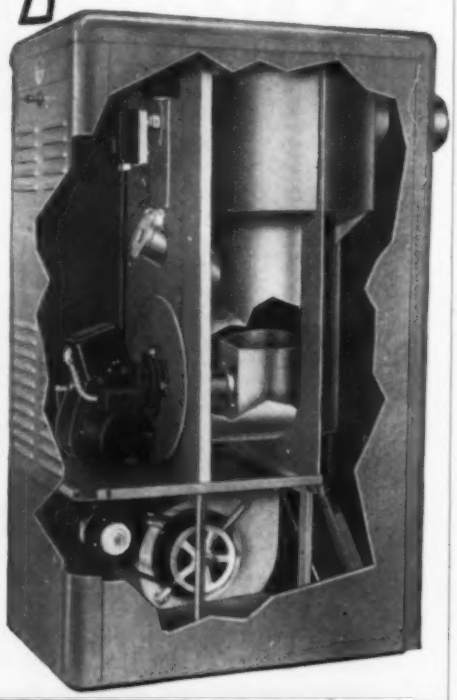
SKIL Tools
ELECTRIC PNEUMATIC
TRADE MARK

LOWER YOUR INSTALLATION TIME and COSTS

The Certified HI-BOY

COUNTERFLOW WINTER AIR CONDITIONER

OIL FIRED HEATING UNIT FOR SMALL HOMES



A COMPLETE PACKAGE UNIT

Complete with oil burner and automatic controls • Assembled and wired at the factory prior to shipment • Crated and shipped to the building site in one piece . . . ready for use when uncrated and fuel and power lines have been connected.

FOR RANCH TYPE OR CONVENTIONAL HOMES!

Floor space only 25"x 38"

The Certified Hi-Boy makes the basement really a livable portion of the conventional home. Both supply and return ducts enter at the top of the Hi-Boy cabinet where they will not be in the way. The cabinet itself is as attractive to the eye as any refrigerator.

In ranch type homes where utility room floor space is so valuable, the Hi-Boy is ideal. The duct arrangement leaves utility rooms uncluttered . . . simplicity of design makes it easy to clean and service in hard-to-get-at places.

Install the CERTIFIED HI-BOY—for optimum comfort and definite fuel savings for your customers . . . easy installation and service for you!

See your Certified representative or write now for bulletin No. 902-C

CERTIFIED FURNACE CO.

DIVISION OF STAINLESS & STEEL PRODUCTS COMPANY

1000 BERRY AVE. • ST. PAUL 4, MINNESOTA

RESEARCH PRODUCTS CORPORATION of Madison, Wisconsin, recently appointed the Thermotrol Corporation, 4164 Ridge Avenue, Philadelphia, to represent them in the sale of R-P air filters and related products in the middle atlantic area.

The Thermotrol Corporation has been identified with the heating and air conditioning business in the area for many years and has excellent facilities for serving the trade.

Bruce Haines

Bruce Haines, vice president of the E. E. Souther Iron Company, St. Louis, Mo., distributors of warm air heating equipment, died on Sunday, October 23rd.

Mr. Haines was widely known in the warm air heating and sheet metal industry. He was the son of the late Bruce Haines, former president of the Souther Co.

Lehman Gross
1885—1949

Lehman Gross, 64, resident of Houston for 50 years, died September 28. He was the owner of Gross' Sheet Metal Works. His company had operated for 41 years and was one of the first sheet metal works in Houston.

He is survived by his wife and daughter.

Roberts—

(From page 67)

journal and summarize them separately at the end of the month so that they may be transferred to the ledger accordingly.

Now consider the debit postings totaling $2,222.72 for internal transfers.

Bad debts	$ 50.00
Trade-in allowance—truck	500.00
Loss on inventory	150.00
Cost of goods sold	1,500.00
Petty cash disbursements	22.72
Total debits	$2,222.72

The $50 bad debt is posted to the bad debt account or direct to profit and loss, the offsetting credit to accounts receivable as shown in C. The $500 trade-in allowance is credited to the truck account receiving the allowance, the offsetting debit is posted to the account for the new truck bought so that it becomes part of its cost. The loss on inventory is charged to a Loss on Inventory account or profit and loss, the offsetting credit to the inventory account. Cost of goods sold is charged to an account of this name, sometimes called Cost of Sales and credited to inventory because the goods have been taken out of inventory and it is reduced to that extent. In this case, if the inventory balance on May 1 was $6,000, this is how the account would look:

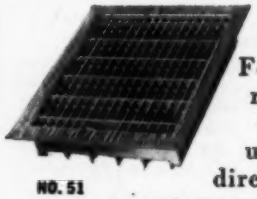
Inventory

Debits	
May 1—Balance	$6,000.00
May—from journal	220.00
Credits	
May—from journal	$1,500.00
Loss on inventory	150.00
June 1—Balance	$4,570.00

This account now shows that the book value of the

A-J GRILLES

★Star Performers in thousands of buildings and homes



NO. 51

FLOOR GRILLES AND REGISTERS

For that special job we recommend our beautiful oak grained finish! Our use of genuine oak in our direct transferring process costs no more, and yet enables us to reproduce on our grilles and registers an oak grained finish that is accurate and beautiful in detail.

VISIT OUR BOOTHS AT THE DALLAS SHOW. NUMBERS 325 AND 327.

SHEET METAL WORKERS AND JOBBERS!

WRITE IN FOR OUR NEW PRICE LIST AND CATALOG TODAY

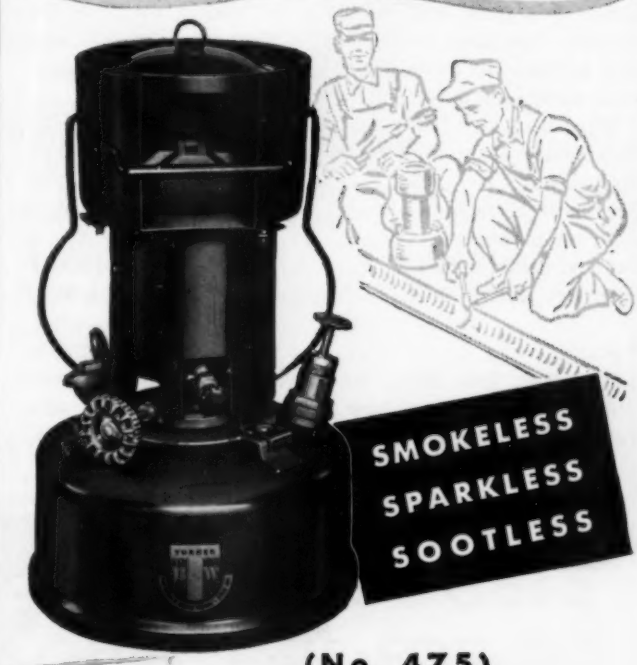
A-J MANUFACTURING COMPANY

2119 WASHINGTON ST. Dept. D Kansas City 8, Missouri

WE'RE ALMOST SURPRISED OURSELVES AT HOW FAST THIS NEW FIRE POT HAS BECOME . . .

TOP FAVORITE

WITH THOUSANDS OF USERS WHO DEMAND THE BEST IN ON-THE-JOB PERFORMANCE!



(No. 475)

TURNER

Low Pressure TINNER'S FIRE POT

We knew when we introduced this new model fire pot that we had a genuinely outstanding development. Months and months of engineering research, experimental testing, on-the-job performance under every condition of service *proved* the fact conclusively! But we were hardly prepared for the immediate — and enthusiastic — acceptance which No. 475 received. Now! Get complete details of these distinctive Turner features: exclusive "carburetor control" . . . more perfect combustion . . . a more intense flame, concentrated to eliminate carbonization and insure longer coil life . . . fast, *safe* operation without the fire hazards of old-style charcoal burners . . . one-gallon capacity with 9-hours burning time to one filling, etc. You'll see for yourself why this superior model is top favorite with the trade! See your distributor or write today!

THE TURNER BRASS WORKS

SYCAMORE ILLINOIS

Since 1871

inventory was $6,000 on May 1, 1949. During the month the contractor bought $220 in materials, which he entered in the journal and posted to this account, making a total of $6,220 for inventory. He sold goods worth $1,500 and had a loss on inventory of $150, a total of $1,650, which deducted from $6,220 leaves a balance (book value) on June 1, 1949 of $4,570. Once you get the debit and credit balancing technique clear in mind, the system provides a profit and loss statement and balance sheet almost automatically.

The $22.72 disbursements on petty cash are credited to this account. Under disbursements on the debit side of the journal summary you charged $25 to this fund, now you credit $22.72, and so, the difference, $2.28 should be in the cash box. If it isn't, check. Sometimes this fund will be off a bit and it may not be traced. You may charge the difference to profit and loss as Loss on Petty Cash or charge it to Miscellaneous Expense.

Next, consider the credit postings of internal transfers. They total $2,270 and cover:

Bad debts	$ 50.00
Trade-in allowance—truck	500.00
Loss on inventory	150.00
Cost of goods sold	1,500.00
Accrued wages	70.00
Total	$2,270.00

The first four items we have covered in the foregoing. We explained how the debits and credits were recorded. So there is only one account to cover, accrued wages.

In this case, the offsetting debit has been charged under labor from the journal. Why is this entry handled differently? To bring within the current month the exact labor cost for that month. Unless you do this you will go wrong on the current month's costs. The reason for the adjusting entry is that payday may come on the 4th of the month and the month end Tuesday, the deadline for the profit and loss statement figures. But your books do not show this wage cost because you pay your help by the week and won't pay them until Friday or Saturday. The wage cost for Monday and Tuesday should be charged up to the current month.

Small businesses can eliminate this entry and make a notation on the profit and loss statement in pencil to show this cost. Large volume contractors will include this cost in Work in Progress and under the account of that name. Even smaller businesses can show sizable variations in net profit because labor cost overlaps from one month to another and they have not made an adjusting entry for this accrued liability. If you have 5 men working and 4 days' labor cost is chargeable to the current month, this cost must get into the books. The payroll checks have not been issued and the current month's net profit will show a discrepancy, perhaps $250 or more, which is enough to throw the books off the beam on comparative analysis month to month. Some months will show up worse than they really were and other months better unless an allow-

(To page 152)

RUBBER
(Neoprene)
PRECISION
BEARING
METAL
Silent
RUBBER
Insulated
Ball Bearing Equipped
EDR rubber insulated pillow blocks are especially designed for ventilating and air conditioning fans, furnace blowers and other installations where quietness is of first importance, and freedom from lubricating problems is a must.
The EDR's remarkable quietness stems from its precision ground ball bearing which is cushioned in synthetic rubber. It is electrically grounded and designed to compensate for normal misalignment during installation and operation.
The housing is a rigid, sturdy one piece casting, service-proven for over ten years. Ample lubricant capacity assures years of carefree service. Lubricant seals are of the labyrinth type—free running—non-wearing.
Write for EDR BULLETIN for complete details and dimensions
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BEARING COMPANY
Manufacturers of CJB Master Ball Bearings
3013 WEST 47TH STREET, CHICAGO, ILLINOIS
CJB by Ahlberg
BALL BEARING
PILLOW BLOCKS

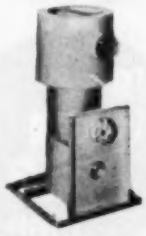
PEXTO NEW 8 FOOT SQUARING SHEARS

No. 196—8 ft. 18 Gauge Foot Shear.
Precision parallel Back Gauge . . . Positive cam actuated Hold-down . . . Rugged welded steel Treadle and Crosshead.

THE PECK, STOW & WILCOX CO.—SINCE 1785—Southington, Connecticut, U.S.A.

80,000 BTU
"R" Series Hi Boy

80,000 BTU
Lo Boy



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Heat Generator

Dealers Say!—"DUAL–X" GETS THE OIL FURNACE ORDER FOR US

STURDY "R" SERIES FOR THE PRICE BUYER

- High Quality Pressure Burner
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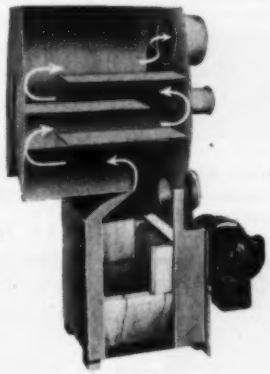
- Beautifully Finished Cabinet

72,000 BTU
Gravity Model

THE TRULY DIFFERENT "M" SERIES FOR THE QUALITY BUYER



"M" Series
Heat Generator

Cutaway showing extremely long flue gas travel—16 ft. on #110M—Constantly upward—No down draft to cause soot accumulation.

Table Top Demonstrator of this Furnace Body Now Available

110,000 - 160,000
210,000 BTU.

Down flow models now available for radiant floor heating
70,000 and 100,000 BTU

DUAL-X FURNACE MFG. CO.
6560 S. Wentworth Ave.
Chicago 21, Illinois
FACTORY—MICHIGAN CITY, INDIANA

Kruckman's Washington Letter

(From page 72)

former boss, has gained for his miners what Murray has not been able to get for his steel workers. Murray is now fighting to catch up with the Lewis program, while Lewis seeks to make further advances beyond the Murray grasp.

Lewis Taunts Murray

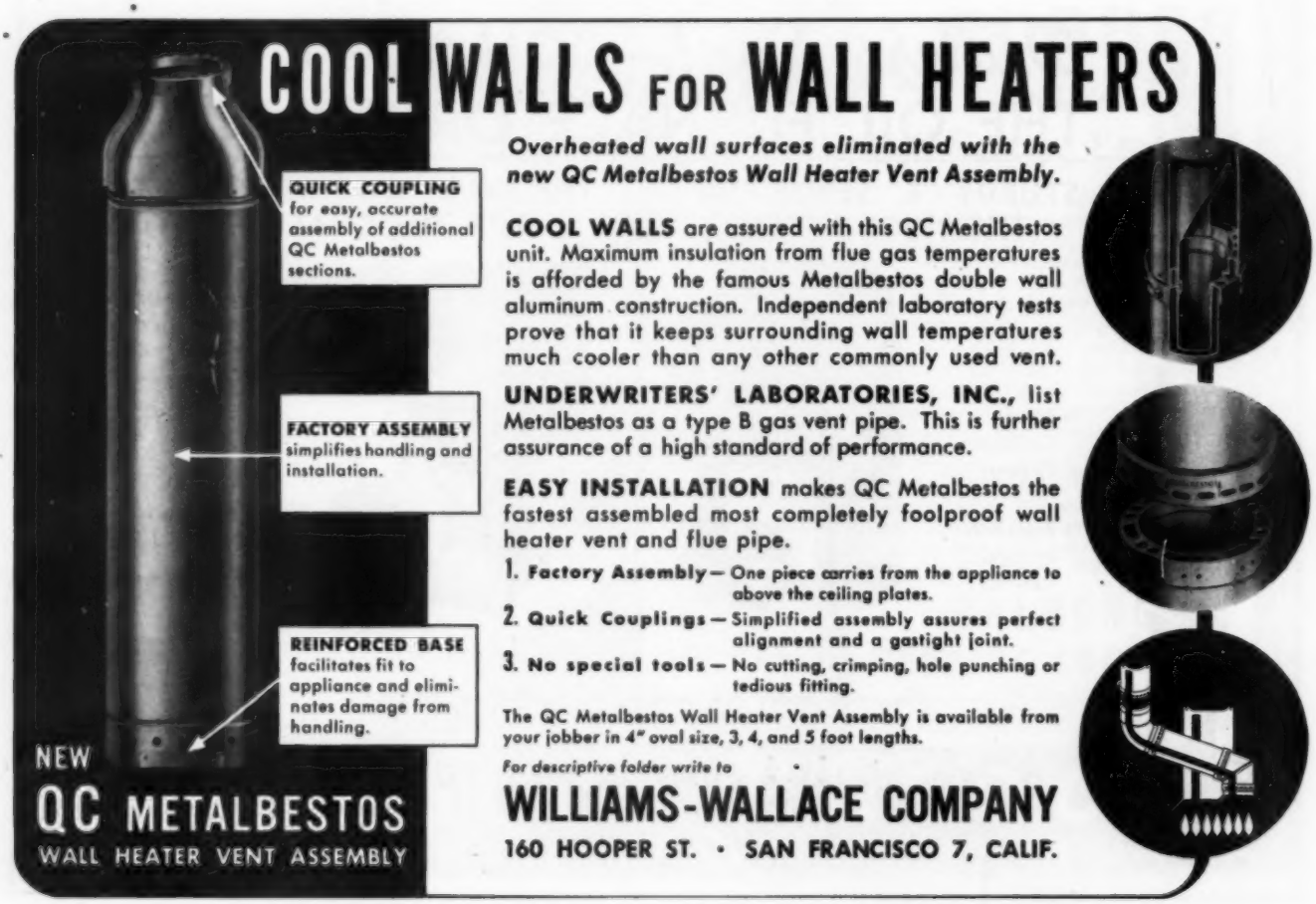
The offer to supply $250,000 weekly to the striking steel workers from the miners' treasury is looked upon here as an effort by Lewis to embarrass Murray. Meanwhile, it is at least an unusual spectacle when the rivalries of labor leaders might have a terrific impact upon the lives and welfare of millions of their fellow citizens who have no power to avoid the involvement. It is reminiscent of the personal rivalries of kings and potentates whose private animosities brought the tragedy of war upon millions of their subjects.

The wage-hour law has been revamped. The new regulations go into effect about February 1st, 1950. Minimum wage for jobs within range of the law will be 75 cents an hour instead of the present 40 cents. It is estimated over 1,500,000 workers now getting 40 cents will get the higher rate. In addition, thousands of higher paid workers will get increases because in many plants the entire wage schedules must be revised upwards after raising the lower-bracket jobs. Lumber, cotton, some metal-working industries, fertilizers, cotton goods, and tobacco products are most immediately affected. Overtime rates remain at time and a half over the 40 hour work-week. Exemptions now cover 2,000,000 more workers, cutting the number covered throughout the nation from 12,000,000 to 10,000,000. Suits for back wages can be filed by the individual or by groups.

Construction Booms

Government sources reiterate that dollar expenditures for new public and private construction are constantly rising. Public starts, meaning actual beginnings of building operations, are still very small relative to the total. Private starts, numerous and constantly increasing, are just about even with last year's peak, and are expected to surpass it. This is regarded by government as the persistence of a huge and uninterrupted demand for housing. The outstanding trend during 1949 has been the greater emphasis on multi-family houses, particularly two-family dwellings. Over 25 per cent of the total starts the first six months of 1949 were of this type. Last year the proportion was 18 per cent. The government promises much more liberal financing for single-unit houses and for multi-family projects. Easier money stems both from government incentive and from private sources. Business and non-residential construction continued to decline during the first eight months of this year. The bright spot in this category has been the activity among public utilities, particularly among gas and electric companies.

Greater availability of supplies and improved efficiency in the util-


COOL WALLS FOR WALL HEATERS
Overheated wall surfaces eliminated with the new QC Metalbestos Wall Heater Vent Assembly.
QUICK COUPLING for easy, accurate assembly of additional QC Metalbestos sections.
FACTORY ASSEMBLY simplifies handling and installation.
REINFORCED BASE facilitates fit to appliance and eliminates damage from handling.
COOL WALLS are assured with this QC Metalbestos unit. Maximum insulation from flue gas temperatures is afforded by the famous Metalbestos double wall aluminum construction. Independent laboratory tests prove that it keeps surrounding wall temperatures much cooler than any other commonly used vent.
UNDERWRITERS' LABORATORIES, INC., list Metalbestos as a type B gas vent pipe. This is further assurance of a high standard of performance.
EASY INSTALLATION makes QC Metalbestos the fastest assembled most completely foolproof wall heater vent and flue pipe.
1. Factory Assembly — One piece carries from the appliance to above the ceiling plates.
2. Quick Couplings — Simplified assembly assures perfect alignment and a gastight joint.
3. No special tools — No cutting, crimping, hole punching or tedious fitting.
The QC Metalbestos Wall Heater Vent Assembly is available from your jobber in 4" oval size, 3, 4, and 5 foot lengths.
For descriptive folder write to
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160 HOOPER ST. • SAN FRANCISCO 7, CALIF.
NEW
QC METALBESTOS
WALL HEATER VENT ASSEMBLY

Cut "Roughing-In" Costs

75% with SUPER SAW

AIR COOLED
PATS. PEND.

PORTABLE ALL-PURPOSE POWER SAW

Fits electric drill, air drill or flexible shaft ¼" - $\frac{5}{16}$"

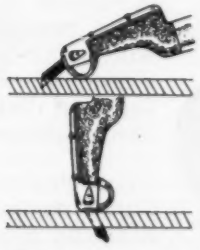
Indispensable for warm air heating, air-conditioning, plumbing and electrical work.

Equipped with special blades, SUPER-SAW rapidly cuts through floors, sidewalls, and roofs! Blades cut through nails without damage to teeth: cut wood, transite, sheet metal and almost any type of material.

Only SUPER-SAW Offers These Features:

- **Air-cooled (Pats. Pend.) Blowing Device which cools mechanism and blows dust and chips from cutting line.**
- **Fingertip control—no torque or spin.**
- **Every wearing surface protected by replaceable bearings, giving low maintenance cost and long life.**
- **Modern design — lightweight, rugged construction, less operator fatigue, longer tool life.**
- **One-shot lubrication.**

Super-Saw cuts directly in without a starting hole.



(above) Shows steps to cut directly in without drilling a starting hole.

SUPER-SAW IS SOLD ONLY THROUGH BETTER JOBBERS IN U. S. AND CANADA. Write for free booklet to—

RCS TOOL SALES CORPORATION

Chalstrom Bldg. **Joliet, Ill.**

for fast installation and a quick OK on the job

specify Kno-Draft,

the completely adjustable air diffusers

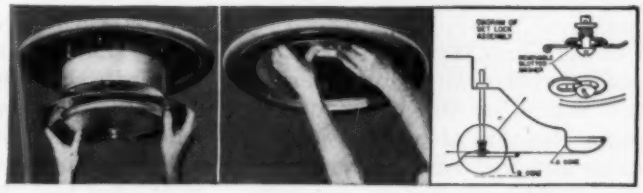


Fig. 1 **Fig. 2** **Fig. 3**

Features like the self-contained inner unit (Fig. 1) and the HD set-lock assembly (Figs. 2 & 3) speed your work along. They are especially handy where ceilings already exist. It's a simple job to remove the inner assembly, attach the outer cone to collar or duct and reassemble the diffuser. The outer cone slips over the suspension bolts and is secured by a slotted washer which keeps the spring loaded catch in compression.

Fig. 4 **Fig. 5** **Fig. 6**

These Kno-Draft features not only speed installation but they eliminate the tough job of figuring everything about the air movement in advance. If people or partitions are relocated while the job is in progress, you can adjust to meet the changes in a jiffy. A screwdriver adjusts the three suspension bolts for any angle of air discharge from horizontal to vertical. (Fig. 4). The single annular air stream permits immediate and accurate velometer reading (Fig. 5). A twist of the wrist regulates the air volume (Fig. 6).

FREE LITERATURE

How to Balance Air Delivery of a System of Manifold Air Diffusers. Reprint of a paper presented at 55th ASHVE Meeting describes method of determining in advance the damper setting for each outlet so as to apportion total air delivery among the outlets in the ratio intended or required. Application is demonstrated by examples.

Handbook on air diffusion. It contains up-to-date engineering data, charts, photographs, sketches and dimension prints that simplify the selection and application of Kno-Draft Diffusers. It shows how you can get top efficiency from an air conditioning system, cut installation time and get off the job faster. Please write Department J-40.

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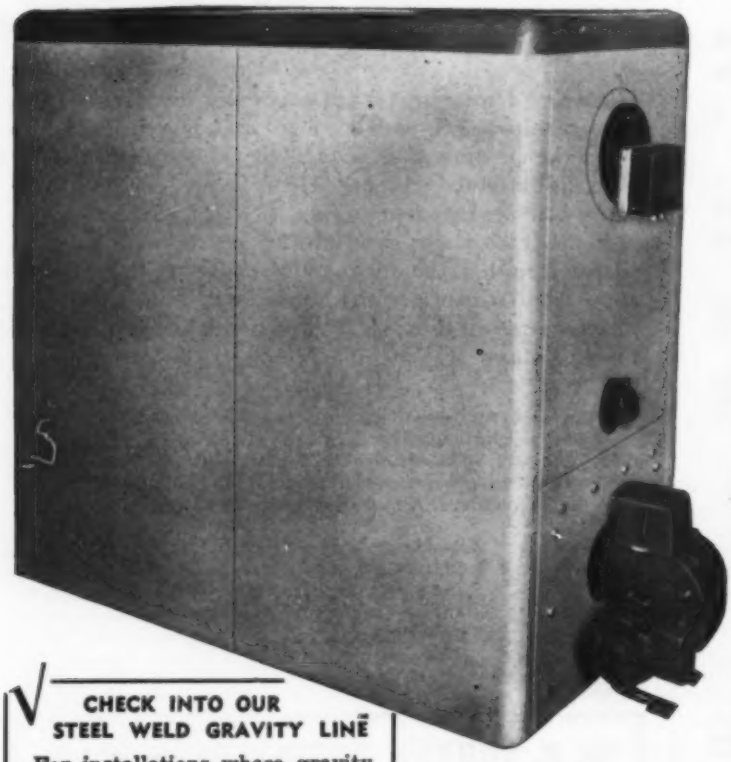
ization of labor is regarded by government authorities as responsible for reduction in cost of building materials and equipment. While lumber and paint have dropped 13 per cent from post-war peaks, structural steel and cement have changed very little. Wages are higher than a year ago which is offset in part by reduction in premium payments and increased output per manhour.

In the senate there is a bill which would authorize an appropriation of $100 million for two years, for advance planning of public works by states and the federal government of a backlog of schools, hospitals, streets, highways, bridges, airports, parks and recreation facilities. It is interesting that the general services administration reports the need for schools is pressingly acute. Nearly 70 out of every 100 schools were constructed before 1930. Twenty out of every hundred schools were built between 1870 and 1890. Hundreds of thousands of children are obliged to double up in their classrooms and go to school in half-day shifts. Millions upon millions in every part of the country are attending classes in buildings that are obsolete, potential firetraps, or totally inadequate. It will take a ten year program, costing about $10 billion to bring about the supply of the nation's school facilities in line with requirements, according to government authorities.

It is estimated total construction in 1949 will run to about $18.5 billion of this total, $13,300,000,000 will be private construction, and $5,200,000,000 public construction. Few federal buildings, except those needed for an emergency, have been built since 1940. However, Congress has authorized an appropriation of $40 million to buy sites and to prepare plans for about 450 federal buildings and post offices, and $30 million for major repairs to federal buildings.

Congress provided $23 billion for the military establishment, or for foreign aid. The total federal budget for 1949-50 is around $50 billion, which constitutes one-fifth of the national output. It is estimated all sources, industry, federal government, and the state and local governments will spend $250 billion during the fiscal 1949. The unfreezing of the enormous federal budget is bound to have a tremendously stimulating effect upon our economy during the next three or four months. It will be spent with industrial plants in all parts of the country and will indirectly touch practically every level. ECA has finally been given $6 billion to continue the shot-in-the-arm treatment for Europe. It is naturally hoped most of these dollars will come back to us. It may be a pious hope only, because there has been a good deal of distribution where they have not readily returned to this country. The foreign aid appropriation involves over $2 billion which will be spent chiefly for arms and other military supplies—in this country. It may interest you to know that the Europeans regard free American dollars as most valuable; the swiss franc comes second; the Belgian franc, third; and ECA dollars fourth.



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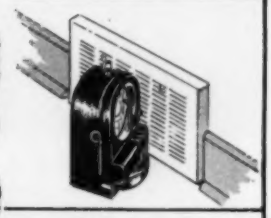
"Makes it easy to check proper thermostat location."

"Used all the time for balancing heating systems."



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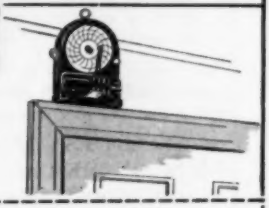

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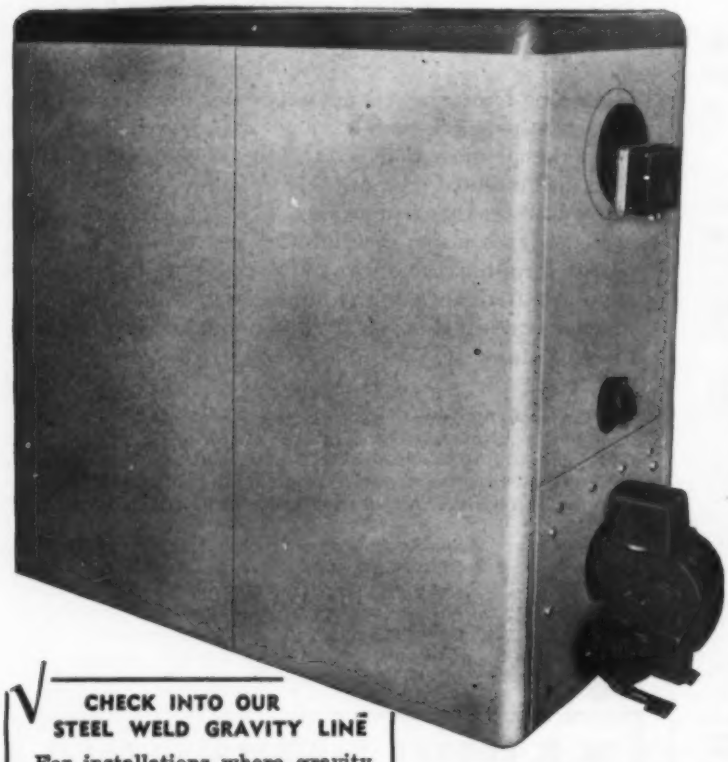

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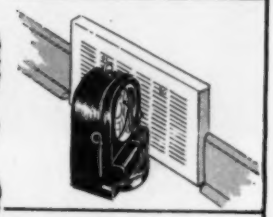

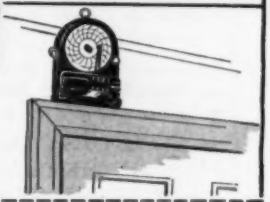

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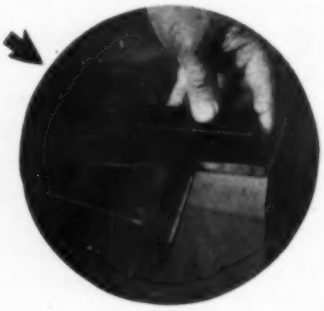

Because forming CLEAT EDGES consume as much as *two-thirds* of the *forming time* on a length of square pipe, when out-dated methods are used.

Forming CLEAT EDGES with hammer and dolly, snap-on pliers, tongs or a slotted piece of metal is an expensive operation . . . as expensive as it would be to use these makeshift tools to make the drive-cleats.

NOW YOU CAN HAVE DRIVE-CLEATING DONE AT ITS BEST!

You can have *Cleat Edges* and *drive-cleats*, that are straight, uniform and identical, no matter who the operator . . . Both done with the only bender that can do both . . . Each exactly fitting the other without the aid of a screwdriver . . . It's no wonder that some users have reported saving the price of a SMITH'S CLEAT BENDER on the first job.

More than 3500 users of these benders have found that they are NOT GADGETS, but are as essential as their *right arm*. . . . They *save more time* than any other tool used on square duct work . . . and are *Usable more often*.

√ **Bends uniform cleat edges in less than 5 seconds!** *Other methods take as much as a minute or more.*

√ **Makes perfect drive cleats in less than 8 seconds!** *Free of ripples and ready to use without the aid of a screwdriver.*

No money tied up in idle equipment . . . And no time wasting adjustments to make, fits any size duct up to width of bender and any thickness up to 20 Gauge.

No. 12 SMITH'S CLEAT BENDER (12" wide) . . . $42.00*

No. 18 SMITH'S CLEAT BENDER (18" wide) . . . $66.00*

(Prices subject to change without notice).

FOB WAUKEGAN, ILLINOIS

For the last word on the performance of these benders see any authorized jobber or tool supplier.

R. E. SMITH

1513 Monroe St. Waukegan, Ill.

ance is made for this accrued liability.

At the end of the year, however, this cost as well as other accrued liabilities should be entered in the books so that the annual statement reflects true profit and all expenses are recorded in order to take credit for them on the income tax return.

At the end of the year the books are closed, which means that the bookkeeper takes debit totals on all expense accounts and charges them to profit and loss, which is an account in itself. Income from sales and other sources are credited to this account; the difference is the net profit if all expenses have been considered.

But, there is a danger to guard against. On most transactions it isn't hard to earmark the entries to the proper accounts. In general, what you take in is income, what you pay out is an expense or adds to your assets or decreases your liabilities. But, certain internal transactions will give trouble and this is so regardless of the bookkeeping system. Depreciation, for example, must be calculated at the end of the year. It should be figured on cost. If the asset cost $1,000 and has a life-span of 10 years, estimated scrap value, $50, at termination of usefulness, you depreciate $950 over 10 years, or $95 a year. This charge can be made through the internal transfers column in the journal, charging a Depreciation account or direct to profit and loss and crediting a Reserve for Depreciation account. When you have to make adjusting entries of any kind in which no cash is involved, make them through the internal transfers account. Sometimes, such entries are necessary, as when writing down or off obsolete stock, adjusting the book value of inventory to make it agree with the physical count, writing off bad debts as we have shown, etc.

When you have charged profit and loss with all expense items, credited it with all income, the net profit is transferred to net worth and becomes an addition to capital investment. If you lost money, it is a reduction in this investment. Charge-offs and credits to the profit and loss account may be handled through the journal column, Internal Transfers, or some accountants just make the transfer on the ledger pages: to wit:

Say the debit balance on the office expense account is $800.

Office Expense

Debits

Dec. 31—Balance $800

Credits

Dec. 31—To profit and loss $800

Then they rule off the account and charge the profit and loss account entering the name of the account (Office Expense) on the line with the year-end date and amount. When all expense accounts and income accounts are written off or transferred to profit and loss there will be no balances on these accounts at all. But some accounts in the books will have open balances, either debits or credits. Assets will be debits, liabilities and net worth will be on the credit side. These figures make up your financial statement. If the ledger was in balance before the expense and income accounts were written off to the profit and loss account, then the assets will equal the liabilities and net worth automatically. That's why a financial statement is sometimes called a balance sheet.

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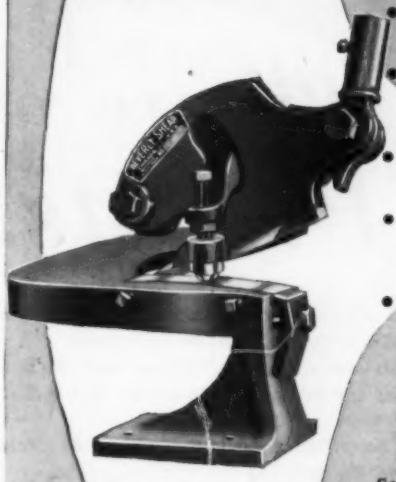

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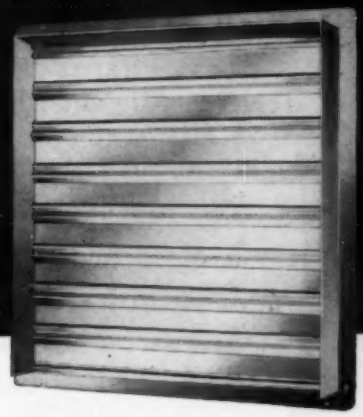

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IT TAKES THE LOAD OFF THE FAN!

Aluminum louvers open fully, permitting capacity fan operation. New heavy reinforcement strip adds strength and long life to the louvers, assures quiet operation and perfect counterbalance, prevents rattling. Deep shroud protects shutter from high winds. Tie-rod, brackets and bearings inside frame, not exposed to weather. Special finish resists corrosion. Many other features.

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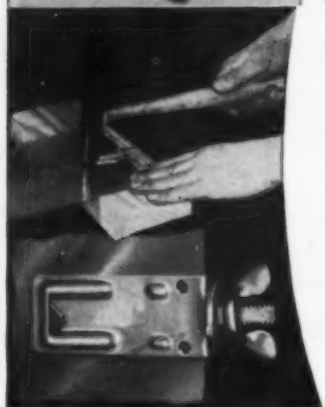
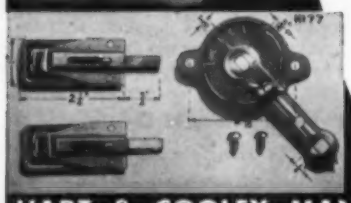
Most Easily and Quickly Attachable Sets on the Market
STURDY • RATTLE-PROOF
NO ANVIL REQUIRED
IDENTICAL 5/16" RETRACTABLE BEARINGS



Simply slip the bearing over the edge of the damper at the bearing line. Lay on any firm surface and strike one solid hammer blow. The prong pierces the damper and is clinched securely in place by the heavily ribbed underside construction of bearing. Fastening is permanently solid, rattle-proof. Identical bearings with retractable bolt make easier installation of regular or splitter dampers in round or square ducts.



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FOR LARGE DAMPERS
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The sheet metal contractor or *Indoor Comfort* dealer should have his accounts audited. If he comes across a transaction that seems dubious insofar as recording is concerned, he should ask his auditor about it. Probably 98 per cent of the transactions follow the regular routine outlined here, but occasionally one may come up that seems confusing.

Write legibly. Record accurately. Even a trial balance of the ledger is no assurance that all accounts are properly recorded. If Mrs. Jones buys $40 worth of accessories on credit and you charge Mrs. Smith in error, the receivables will show the right mathematical total in the ledger and the ledger will balance, but behind the balanced figures is a hidden error. Eventually, most of these hidden errors come to light. In this case, when Mrs. Smith gets a bill for the accessories, she'll complain and an investigation will show that Mrs. Jones should have been charged. But in some cases, the error may not come to light so readily. For example, if you charge up too little for depreciation and credit the reserve with the same sum, this may not come to attention until the equipment is to be written off. By that time you can't retrieve the loss because you cannot assess your customers for the difference nor can you get a reduction on your income tax for this prior expense. The tax office does not allow a taxpayer to recover in a current return any depreciation he didn't take in prior years, when the facts were obtainable.

Old Age Benefits—

(From page 70)

payments, amounting to ½ of the worker's primary benefit for each child until they become 18 years of age.

2. A widow, regardless of age, caring for a child entitled to benefits, receives monthly benefits, amounting to ¾ of the worker's primary benefit, until the youngest child is 18. Her benefits stop at that time but begin again when the widow reaches age 65 if she has not remarried.

3. A widow without a child in her care receives monthly benefits amounting to ¾ of the worker's primary benefit when she reaches age 65, if she has not remarried.

4. Dependent parents (65 years of age or over) of a deceased worker who left neither widow nor child who might become entitled to monthly benefits, may receive monthly payments if they were chiefly supported by the worker at the time of his death. These payments amount to ½ of the worker's primary benefit for each parent.

For children under 18 and widows with such children in their care, the law provides monthly benefits even when the worker was only currently insured at the time of his death.

Lump sum death benefits are payable in the case of either a fully or currently insured worker in the event that there is no survivor entitled to monthly benefits. In other words, if the widow of a deceased worker is not 65 at the time of his death, and has no child under 18 in her care, she is eligible to receive a lump sum payment amounting to six times the worker's primary

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"DOC" (WITH THOUSANDS OF SATISFIED CUSTOMERS) SAYS:
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FIRST furnace blower made commercially in the Middle West. . . . TWENTY years of service in thousands of homes . . . continuing demand is PROOF of PREFERENCE for QUIETER operation.

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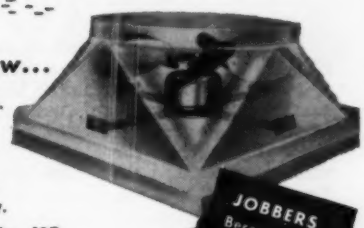

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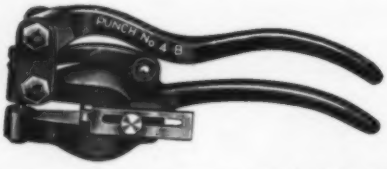

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benefit. She may receive this at the time of his death and still be eligible for monthly payments amounting to ¾ of the worker's primary benefit when she reaches age 65 if she has not remarried.

In case there is no widow, child, or parents eligible for any survivor benefits, the lump sum payment is made to the nearest relative or to the person who assumed the worker's burial expense. In the latter case, this payment will equal only the actual amount of funeral expenses incurred.

In discussing old age benefits with an employee, it is important to stress the fact that benefits must be applied for at the nearest social security field office as soon as the worker is eligible to receive them. If an insured worker dies before reaching 65 years of age, his survivors should apply for benefits immediately. Benefits are never paid automatically. Any delay in applying will result in loss of time before monthly payments start.

Complete details on all phases of Federal old age insurance are available at every social security office. It is worthwhile to keep a file of this information for easy reference so that you can thoroughly familiarize yourself with the plan and be ready to answer all questions which your employees may ask about the social security program.

Basementless Houses—

(From page 82)

the perimeter duct. The large number of factors that can affect the heat emission make any calculations of the heat flow mere approximations. Nevertheless, the magnitude of the panel effect can be estimated, and this would be of interest. For any given surface temperature, the panel heating effect can be obtained from the calculated values shown in Table 2, which are reproduced from an article by J. R. Carroll, Jr.

Values shown in the second column of Table 2 were utilized, as described in answer 15, for determining the relationship between the duct air temperature and the panel surface temperature. Heat emission values given in the table include not only the radiation heat transfer from the panel to the cooler surfaces in the room, as well as the convection heat transfer from the heated panel to the cooler room air. These values are probably on the conservative side, since the calculations were based on still air conditions above the panel surface, whereas in practice some amount of air motion may exist due to drafts from windows and cold wall surfaces.

However, it may be noted that a panel surface having a temperature of 100 F will have a heat emission of about 62 Btu per hour per sq ft, whereas a panel at 85 F will have a heat emission only half as great. The panel heating effect reduces sharply as the surface temperature drops. Hence, a room having a panel length of 20 ft (composed of surfaces below which run the feeder duct or the perimeter duct) will have a total panel heating effect that is 20 times the unit value shown in the table.

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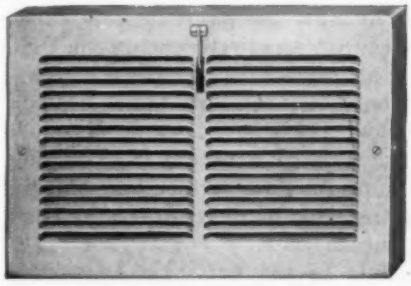

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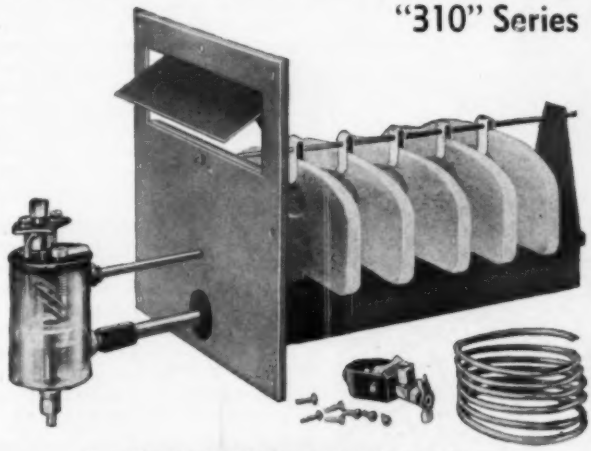

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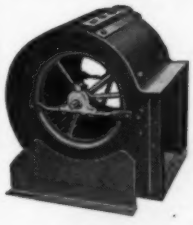

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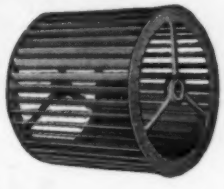

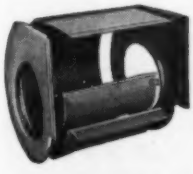

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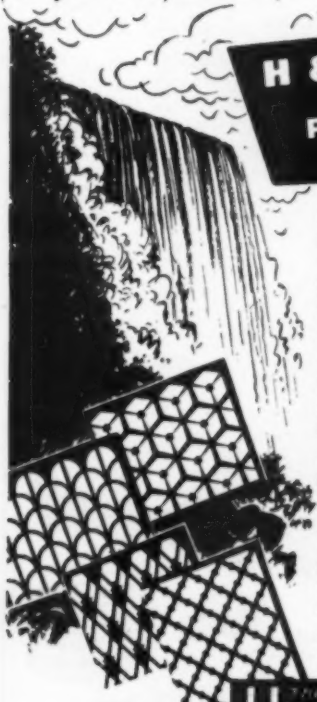

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Even with an average surface temperature of 100 F for the 20 ft this emission amounts to only 1,240 Btu per hour. In an installation for which the panel temperature will be less than 100 F the panel heating effect will be smaller. These panel heating effects have been estimated and included in the capacity tables presented in the earlier part of this series of articles. At most, the panel heating effect is not large. One cannot escape the conclusion that a perimeter warm air system is primarily a convection system, and only incidentally a panel heating system. Nevertheless, the small amount of panel heating effect that can be expected is extremely effective in increasing the floor surface temperature at a point where the greatest difficulties have been previously experienced.

The authors would be the first to acknowledge that the assumptions made in the calculations given in answers 15 and 16 are not based on test data, which are still to come. Nevertheless, even if the assumptions are not fully correct the values that have been presented should not be greatly changed. The worth of these preliminary estimates lies in the fact that they point a way for future investigators to conduct their tests.

Q. 17. *Effect of Carpets on Panel Effect.* If the floor surface consisted of bare concrete, or was covered with carpets or a wood floor, would the system function satisfactorily?

A. The discussion presented in the previous two items shows two factors of interest. The first is that out of a total resistance to heat flow through the per-

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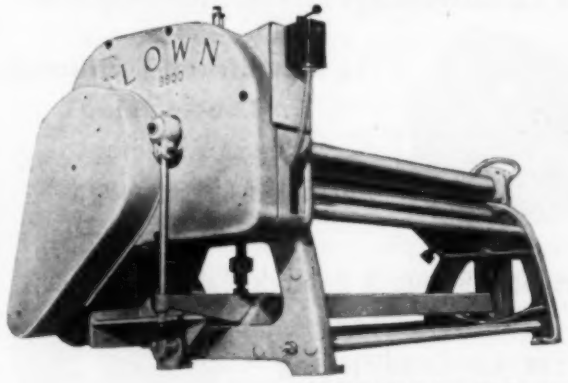

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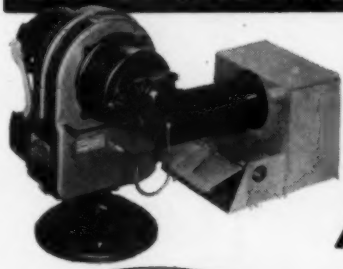

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Model has a capacity of 85,000 B.T.U.

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imeter duct to the floor surface of 0.90, the resistance of the air film on the inside of the duct is about 0.69, and that for the asphalt tile is only 0.04. Removing the asphalt tile and exposing the bare concrete will not change the total resistance materially, and hence will not greatly affect either the surface temperature or the panel heating effect.

The second point is the possible effect of a wooden floor applied directly over the concrete. In this case the resistance of the wood floor will be about 0.78/0.80, or 0.97. This amount added to that for the inner air film and the concrete will give a total resistance of 1.83, which is twice as great as the floor covered with asphalt tile. In this case, as also in the case of a floor covered with thick rugs and carpets, the total resistance will be changed sufficiently to affect both the surface temperature and the panel effect. In other words, addition of wood flooring, rugs, or carpets over the feeder duct or the perimeter duct will tend to insulate the heated floor. As pointed out previously, however, the perimeter warm air system does not depend to any great extent upon panel heating to offset heat losses from the space. A reduction in panel heating effect will simply mean that the temperature of the air in the duct will not decrease as rapidly as we have assumed, which means in turn that the air temperature at the register will be higher than anticipated. The authors foresee no difficulty in balancing the system, and no necessity of offering separate tables of capacities for different types of

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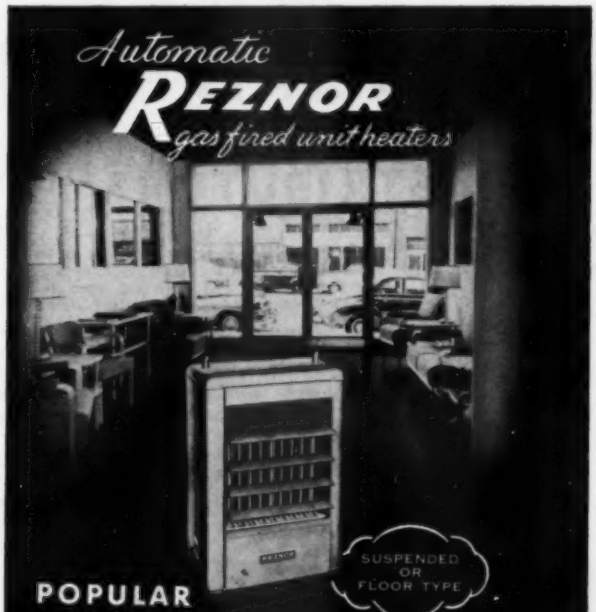

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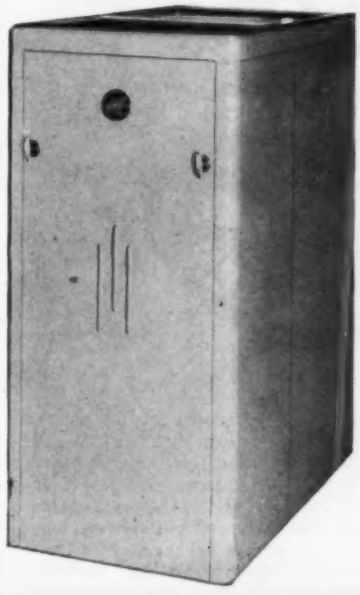

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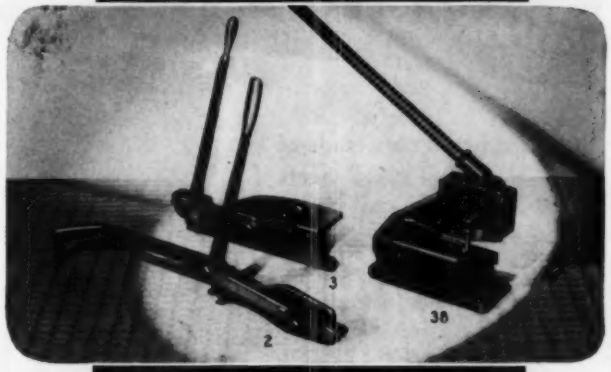

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floor coverings. Theoretically, of course, if the air temperature in the perimeter duct is increased by the addition of floor coverings, the edge loss from the building should tend to increase somewhat. The increase is too small to be a significant factor. This self-balancing feature of the perimeter warm air system is a fortunate attribute of the system, because any changes in the flooring that may be made at a later date should not result in a necessity for a change in damper adjustments at the register face.

Snyder—

(From page 77)

the temperature at the thermostat to rise and as the increased temperature affects the bimetal, the moving contact leaves the fixed one and the circuit is broken.

Fig. 11-B shows a modulating type thermostat in which a bellows is the temperature sensing element. As the temperature increases the bellows expands and as the temperature decreases the bellows contracts. The bellows is anchored at one end and in contact with a spring-loaded potentiometer wiper at the other so that the linear motion of the bellows is given to the wiper causing it to move back and forth across the potentiometer coil. This system is used in modulating type controls to make possible many positions of the controlled object between open and closed.

However, even in the device described in Fig. 11-B

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droop is present. In this case the droop is occasioned by the fact that as the temperature at the thermostat falls the wiper moves toward one end of the potentiometer and the controlled device goes toward the open position. Then, as the temperature at the thermostat rises the bellows expands and forces the wiper toward the other end of the potentiometer and the controlled device goes to the closed position. Obviously, then, in order to keep the wiper at the open end of the potentiometer, the room temperature must remain low enough to keep the bellows contracted and thus droop is introduced.

The electronic controls under discussion also show droop due to the fact that the cycler is attempting to restore the bridge balance and shut the system off. In order to prevent the cycler doing this, it is necessary that the room temperature fall enough so that the decreased resistance at the thermostats more than offsets the increased resistance due to the heating of the cycler. However, where droop is almost impossible to eliminate in a mechanical thermostat, it is easily overcome in an electronic control system.

The outdoor anticipator can be used very handily to eliminate droop and even go further and actually raise the control point as the outdoor temperature falls. Since droop is a direct function of heating load and load can be considered a direct function of outdoor temperature as shown in Fig. 6, then a nominal resistance value can be assigned so that the change in resistance in the cycler is offset by the change in resistance at the outdoor anticipator, plus enough to

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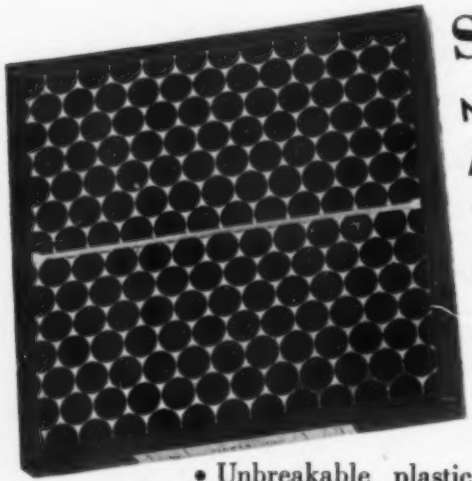

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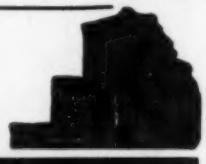

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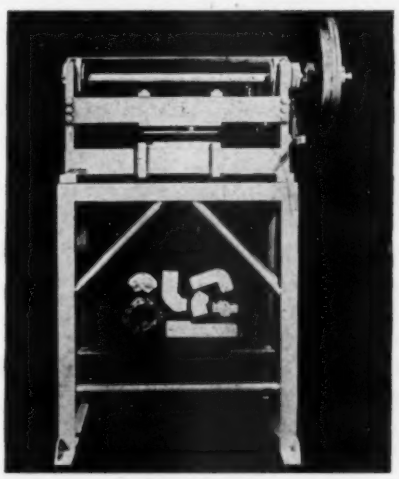

THE HUSKY PRESS illustrated above is available in two models, H24" and H36". The bed area is 8" x length of machine. Sample cuts are also illustrated above. These and hundreds of other shapes can be made by the standard Husky—in steel up to 24 ga., and 16 ga. in aluminum. The Husky Press can be made for heavier gages upon request. Dies for these presses may be obtained at great savings. Write to us for free quotation and state your particular problems.

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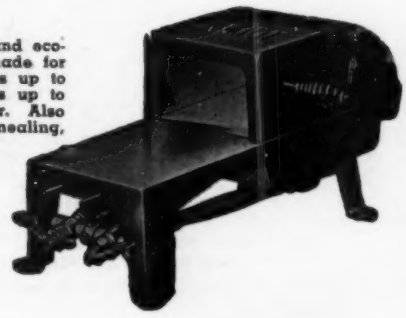

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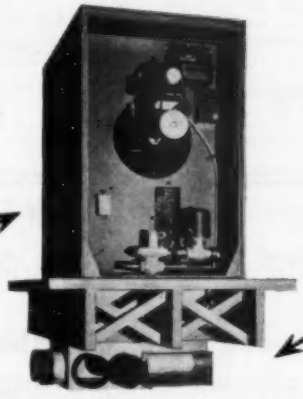

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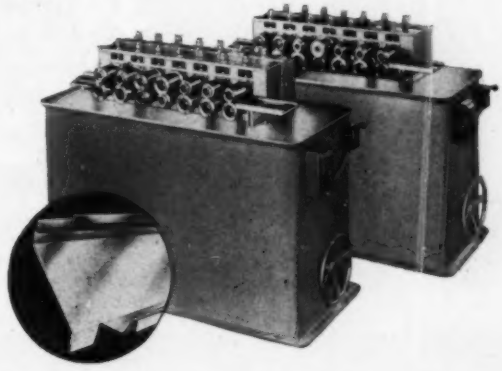

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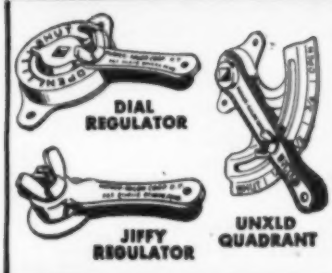

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PARKER-KALON damper controls

raise the control point the desired amount.

The following simple computations show how this is done in a hypothetical case:

Assume full heat desired at 0 F outdoor temperature

Maximum resistance gain in cycler known to be 6 ohms from experimental data

Coefficient of wire 0.0024 ohms per ohm per deg

70 F - 0 F = 70 F change in outdoor temperature.

70 x 0.0024 = 0.168 ohms per ohm per 70 F

6/0.168 = 35.8 ohms to overcome droop

Desired 1 F rise in control point for every 40 F drop in outdoor temperature.

70/40 = 1.75 F rise in control point at 0 F outdoors.

1.75 x 2.4 = 4.2 ohms rise needed at thermostats.

4.2/0.168 = 25 ohms

25 +/ 35.8 = 60.8 ohms necessary in outdoor anticipator at 0 F outdoors.

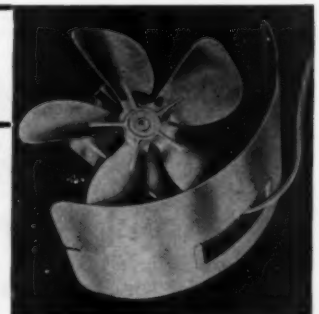
6 +/ 4.2 = 10.2 change necessary at thermostat

60.8 x 0.0024 x 70 = 10.2144 change (proof of foregoing calculations).

So, if the outdoor anticipator has a nominal resistance value of 60.8 ohms at 70 F, it will overcome the droop caused by the cycler and also raise the control point to maintain comfort conditions. And, of course, it still performs its initial function of signalling changes in outdoor temperature before those changes are reflected in the inside temperature.

Fig. 5 indicates only the external control elements and does not attempt to show all of the resistance elements that are important only to the internal circuit.

HEAT THAT COLD ROOM



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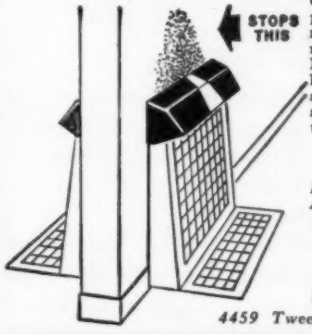
Adjustable Register Hoods Eliminate Smoke and Soot Streaked Walls



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ALMAR EASY SLITTER

FOR USE WITH BRAKE OR BENCH

Speed up your work—without an 8' or 10' Square Shear

The Rotary action of cutters produces a neat, accurate clean edge.

PRICE—COMPLETE

Almar Easy Slitter

with cutting head & track

8' Brake Type	—	$60.00
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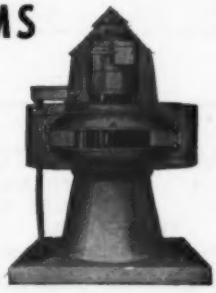

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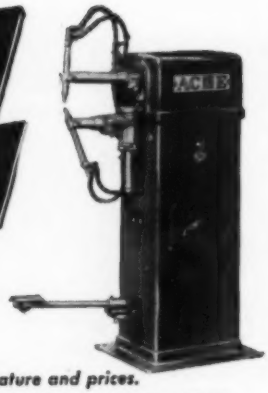

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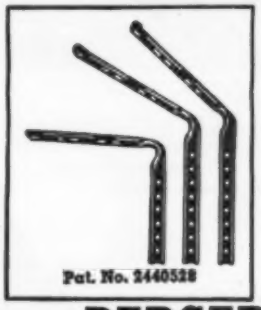

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La Salvia—

(From page 88)

Summary of Heating Loads

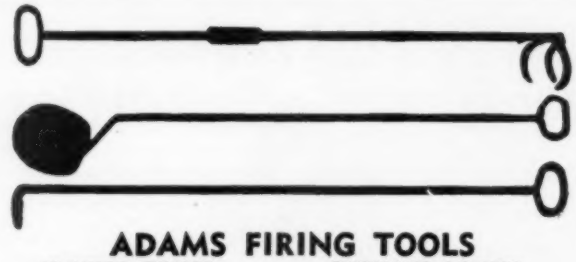
	New Orleans	Cleveland	Minneapolis
Total Btu per hour	46,340	58,540	79,990
Total cfm	889	907	920
Infiltration—cfh	20,550	14,205	14,205
Temperature entering air	115 F	125 F	145 F
Air changes per hour	4.3	3.7	3.7
Water gph (humidifier)	.3	.5	.6

Cfm calculations have been based on the assumption that the same air volume is to be used for the summer cooling system. For this reason a slightly lower temperature is used for New Orleans than for Cleveland, and the Minneapolis figure is the highest of the three. Because outside temperatures in New Orleans are not as low as in the other two cities an entering temperature of 115 F is adequate.

Same Ductwork for Cooling

When designing a completely air conditioned home plans should be based on using the same duct system for cooling as for heating. The calculations given here all specify approximately 4 air changes per hour and so conform with modern practice.

Next month's installment in the series will discusss the calculation of cooling loads for the same house used in this article.



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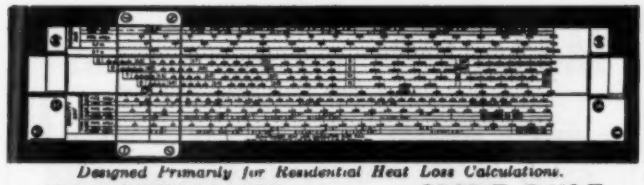

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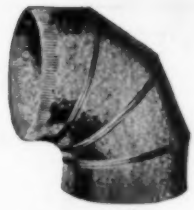

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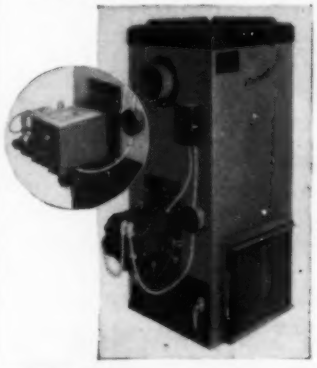

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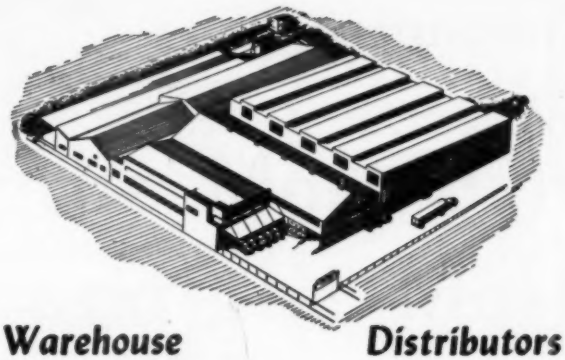

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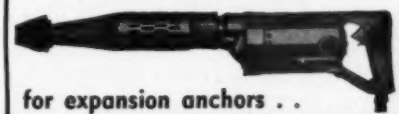

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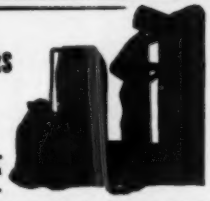

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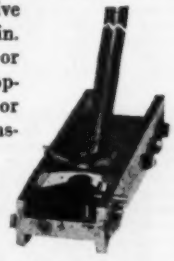

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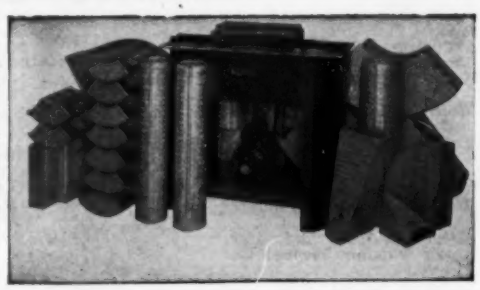

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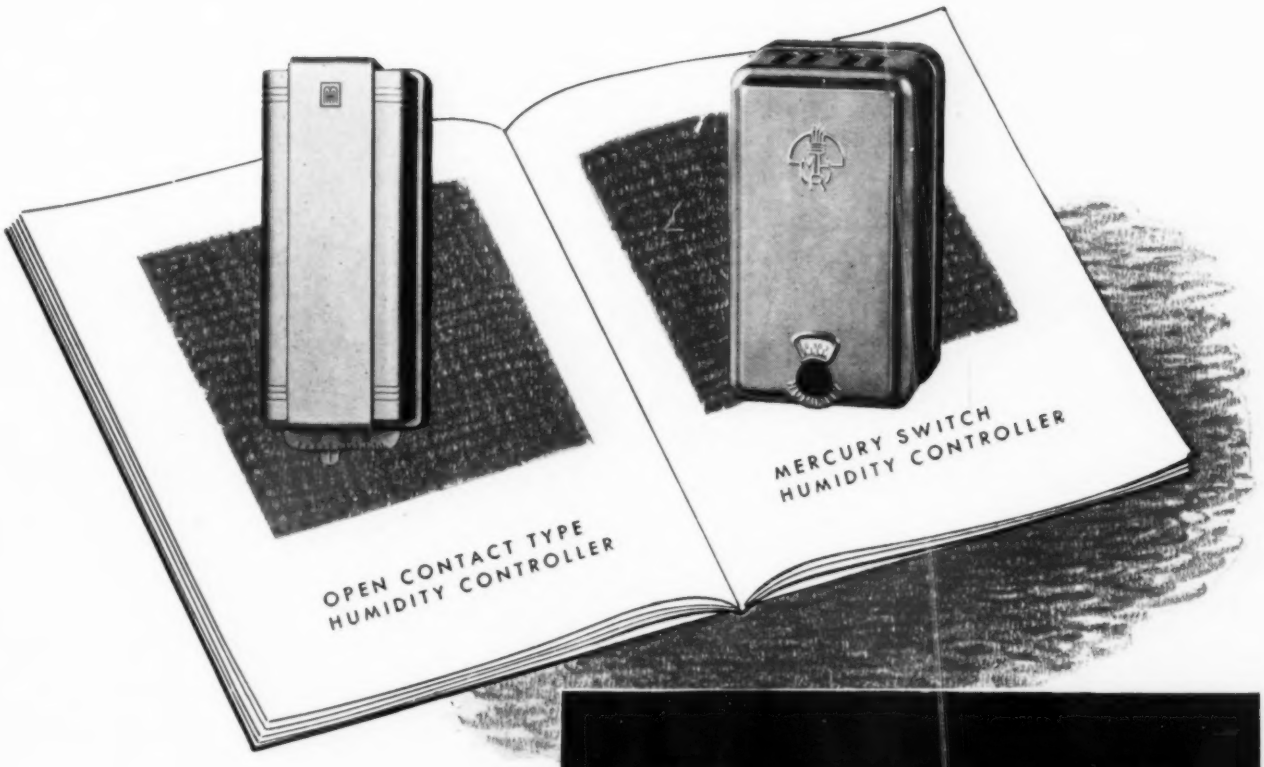

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